DEVELOPMENT OF QUESTION BANK IN BIOLOGY AT HIGHER SECONDARY LEVEL OF SOUTHERN REGION

A REPORT

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P R E F A C E

"If measurement is to continue to play an increasingly important role in Education, measurement workers must be much more than technicians. Unless their efforts are directed by a sound educational philosophy. Unless they accept and welcome a greater share of responsibility for the selection and clarification of educational objectives, unless they show much more concern with what they measure as well as how they measure it, much of their work will prove futile or ineffective".

- E.F. Lindquist

Education is an extensive, diverse, complex enterprise, not only in terms of the achievements it seeks to develop, but also in terms of the means by which it seeks to develop them. Our understanding of the nature and process of education is far from perfect. Hence it is easy to agree that we do not know how to measure all important educational outcomes. But in principle, all important outcomes of education are measurable.

Keeping this in mind, an attempt has been made in the present workshop on Question Bank in Biology for Southern Zone. Teachers of +2 level, many of whom do not have any formal teacher training, find it very difficult to set the question papers based on defined educational objectives. In the present workshop, participants were exposed to variouis aspects of scientific evaluation such as the blue-print, Question items, etc. Some guest lectures were arranged on various aspects of evaluation and they were trained in the construction of objective based test item in Biology for the syllabi of Tamil Nadu and Andhra Pradesh.

The system of evaluation is loosing its credibility day-by-day. The committees and commissions have pointed out that there are some glaring defects in the traditional system of examination. Efforts have to be made to improve its reliability, validity, and objectivity as well as to bring about a closer integration of teaching, learning and evaluation. It is very significant that we should evolve a better system of evaluation to assess the achievement of a student so that it is acceptable to all.

The main function of the Question Bank would be to make available evaluation items to teachers, students and examining bodies together with associated information which they might wish to use in preparing their own tests and examinations during or at the end of the course. But in the present workshop we have given emphasis for developing more types of questions/evaluation items of diverse nature more suitable for Biology content at higher secondary level.

I take this opportunity to thank all my esteemed colleagues for their relentless work. My special thanks are due to **Prof. K. Dorasami**, Dean of Instruction, **Dr. G.P. Basavaraju**, RIETEC, Bangalore, **Dr. Manjula P. Rao** and **Dr. G. Anwar**, for their academic support.

I thank our Principal, **Prof. G. Ravindra**, for providing us all the help and facilities.

My thanks are also due to **Sri. B.K. Venkatesh**, for his help in preparing this report.

Place: Mysore

Date : 10th March 2000

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INTRODUCTION

It has been recognised that for meaningful education, the assessment of students must be sensitive to the aims and objectives of curriculum. Examinations are powerful tools to reflect both good and bad in the teaching learning process. The public examinations more often encourage memorisation of facts and repetition of factual concepts of biology and not the understanding and application of concepts. Assessment is not merely a part of teaching. It is central to teaching because it reflects the quality of an educational system. It is an activity that goes hand in hand with the teaching.

Both internal assessment and public examination have a few disadvantages. Principally the assessment that is normally done, is norm-referenced which helps in ranking or finding jobs. There is very less emphasis on criterion referenced assessment, which is essentially diagnostic and helps in measuring the attainment of knowledge and skills. However internal assessment is slightly better than public examinations in that it is more diagnostic in nature. But the effectiveness depends on the design of the tests/questions to evaluate the curriculum.

Questions can be broadly classified into

a. Fixed response questions and

b. Free response questions

Botany/Zoology examinations consisting of open-ended questions, skill-oriented, application level questions are

more important because, the scope and nature of the subject is such that some times to understand about a system a neat labelled diagram can explain many details of the system and their respective positions. Hence the expectation from a pupil is not only recall knowledge, but also the skill of drawing and interpretation of the different parts and their functional aspects of the system. The structured questions with a restricted answer has limited scope for thinking. It is possible to use a variety of questions even under structured pattern of questions.

Examples for fixed response questions:

1. Multiple choice tests
2. Completion type
3. Matching type
4. True/false type
5. Skill oriented type like draw, label and sketch

Examples for open-ended questions:

1. Suggest a method for the preparation of an onion root tip for (cytological smear) for observation of different stages of mitosis.
2. Steps involved in mounting the embryo from a seed.
3. Design an experiment to study the rate of photosynthesis under different wavelengths of light.

CONCEPT OF EVALUATION

DR. G.P. BASAVARAJU

From educational view point evaluation may be defined as a systematic process of determining the extent to which educational objectives are achieved by the pupils.

The expected competencies developed through teaching are to be measured periodically, which will reflect the academic performance/scholastic achievement of the child. This is done through the testing process. Testing is a component of teaching-learning process. Testing is to test a few/sample competencies only.

Testing discloses/reveals the academic performance of the child in term of quality, i.e. numerals/grades. These numerals are the basis for a teacher/institution to convert them into the quality. This is done based on values. The first element of this activity, i.e. awarding marks or grades is valuation. Valuation strengthens the hands of teachers to offer judgement about child's progress. Value judgement is based on the values obtained through valuation. Valuation plus value judgement, within the prevailing norms, leads to evaluation.

VA + VJ ----> EVA

Evaluation is a comprehensive and continuous process to assess the behavioural changes which includes knowledge, competencies and changes in attitude, aptitude, interests, values and skills.

Evaluation is a sequential process with four stages, viz. input, process, diagnostic and product. In educational terms, these are called the types of evaluation.

The input evaluation is to know the capacities of the child at the entry level and coping up strategies. That is why this is called 'Placement Evaluation'. The child is processed through teaching and learning throughout the academic year. The progress of the child is measured periodically through process of evaluation. In case, the performance of the child is not upto the expected level or it falls down from time to time, the necessity of diagnostic evaluation arises. This helps us in knowing the factors or causes responsible for the decline/deficiency in achievement. This helps the teacher to find remedies to overcome the problem and help the child for proper growth. This is a diagnostic evaluation, at the end of the academic year. There is a need to assess the overall performance of the child which is termed as summative evaluation. This enables the teacher/system to qualify/certify the child for further upward movement in career or further promotion to higher classes.

In oral approach, the teachers employ tools like questioning, discussion, debate and more frequently quiz.

Firstly evaluation implies a systematic process, distinct from casual, uncontrolled observations of pupils.

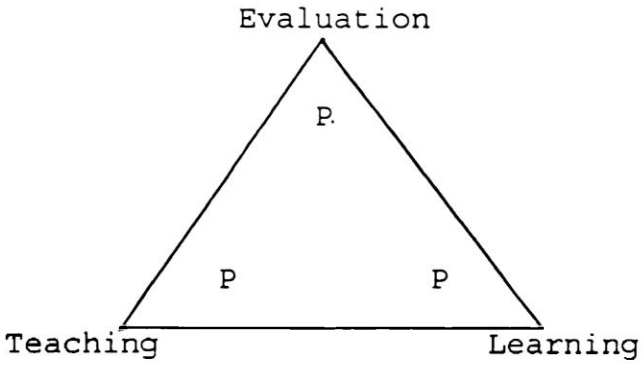
Secondly, evaluation assumes previously identified educational objectives.

Evaluation is a much more comprehensive term than 'measurement' which is limited to quantitative descriptions

of pupils behaviour. Evaluation includes both qualitative and quantitative descriptions of pupil behaviour with value judgement concerning the desirability of that behaviour. Measurements does not include judgements concerning the value of the behaviour observed.

Purpose of Evaluation

The main purpose of evaluation in a classroom situation is to change pupil behaviour in a desired direction. Thus evaluation becomes an integral part of the teaching-learning situation. The desired directions are educational objectives established by curriculum. Thus evaluation becomes the process of determining the extent to which these objectives are achieved:



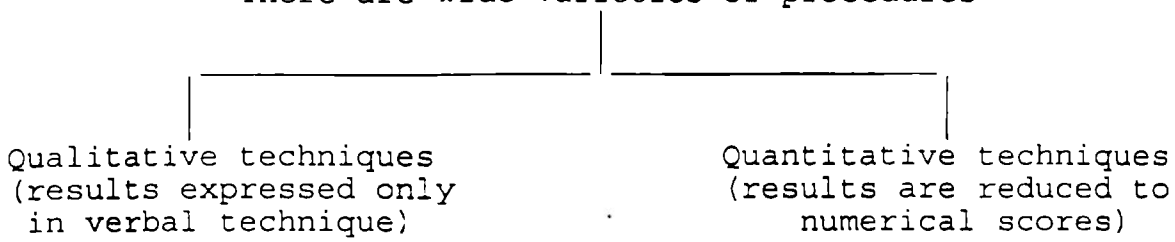
P = Process

The interdependence of these three facets of education is clearly recognisable from the following steps.

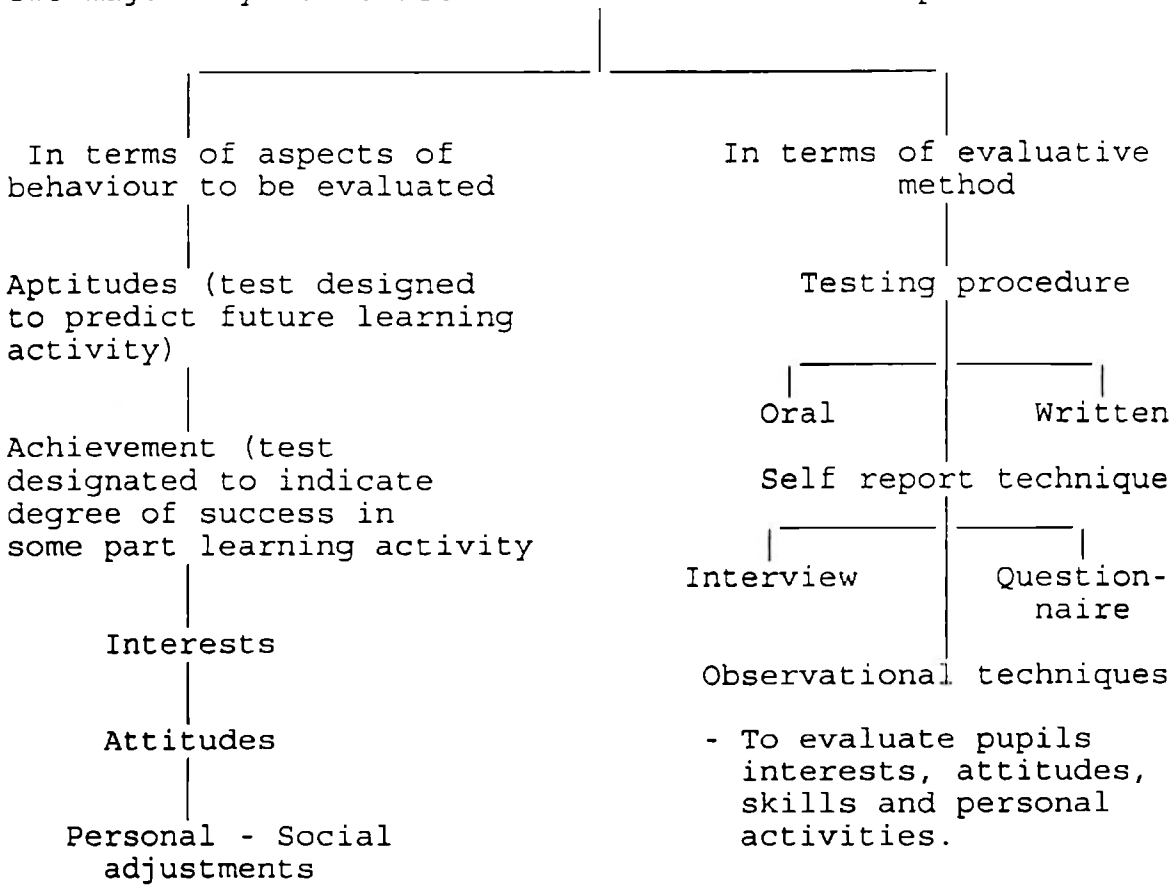
1. Identifying and defining the objectives in terms of desired changes in pupil behaviour.
2. Planning and directing learning experiences in harmony with the stated educational objectives.
3. Determining pupil progress towards the stated educational objectives.

4. Using the results of evaluation to improve learning and instruction.

Types of Evaluation Procedures



In addition to this broad classification, there are two major ways of classification of evaluation procedures.



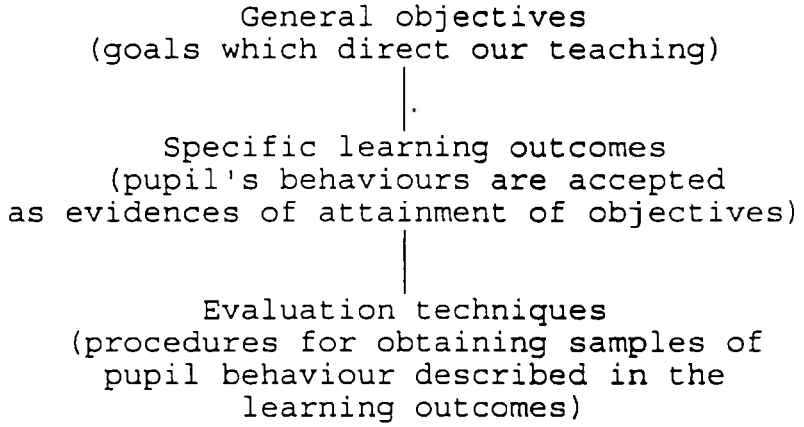
General Principles of Evaluation

1. Determining and clarifying what is to be evaluated has priority in evaluation process.
2. Evaluation techniques should be selected in terms of purposes to be served.

3. Comprehensive evaluation requires a variety of evaluation techniques.
4. Evaluation is means to an end but not an end itself, henceforth it should be comprehensive and continuous.

Relating Evaluation Procedures to Objectives

The following sequence of steps summaries this procedure.



All the procedures used in evaluation programme should possess certain common characteristics.They are of validity, reliability and objectivity.

Validity

Any good test should be measured what it claims to measure.

In construction the following points are to be followed.

1. Determine the scope of the test

Does the test cover a lesson, a unit, a phase a specific job or some other measurable part of the training activities

2. **Determine what is to be measured**

Design a test that measures attitudes, abilities, skills, knowledge, understanding are application or mastery of principles and facts.

3. Select the test items

Write items for each topic and/or subtopic without regard for the number of test items that will be used in the final draft or prepare as many examination items as possible.

4. Select the technique

Try to select the testing technique most suitable for the purpose of the test. Always keep in mind the objectives of the training programme.

5. Fix the length of the test

Choose the number of items that will cover the instructional material adequately.

6. Selection of the final items

Choose those items that treat the most essential and significant portions of instructions. Never use a test item to measure material not covered by the instructional activities.

7. Arrange the test items in final form

Group similar items together and arrange them in an appropriate and approximate order of their difficulty.

8. Prepare directions for the test

The instructor is obliged to make it perfectly clear what the trainee is to do and how the trainee is to do it.

a. Prepare the scoring divides aid in the speed and accuracy of evaluating the pupils.

Reliability

A good test item is one that is reliable and made on the basis of validity. It gives the same rating to a

candidate even if he is examined by different examiners at different times. The other criteria involved in evaluation are comprehensive practicability and acceptability.

Objectivity

A test can be considered to be objective, if the scoring of the test is not affected by the examiner's personal judgement. Thus the opinion, bias or judgement of the examiner can have no influence on the results of the objective test.

Functions of Assessment

Two main functions of assessment can be perceived. One is norm referenced in which the main function is to discriminate among students and place them in an order of merit. It is essentially competitive, the result being used for selection purpose. The second is criterion-based or referenced. It is essentially diagnostic, describing the knowledge or skill, which students have attained or not.

EVALUATION IN BIOLOGY

The overall purpose of teaching biology at the senior secondary level is identified under the following heads. The knowledge, competency and skills to measure these attitudes and skills or cognitive abilities we need a scale or an evaluation tool. So keeping this in mind the present workshop has been envisaged to facilitate biology teachers to have a "Question Bank" to cater to the needs and to assess the overall performance of the students in different content areas of Biology at higher secondary level.

The present exercise has been taken up for state syllabus books of southern region (Tamil Nadu, Andhra Pradesh, Karnataka and Kerala). As per the NPE 1986, the child centred approach to education or learner centred approach has assigned the teacher a changed role of facilitator of learning process or an organiser of the learning situation or to stimulate curiosity and independent thinking, develop problem solving skills, promote (teach or impart) planning and execution of projects. Self-learning involving acquisition of knowledge, through observation, creative thinking, and activities by peer learning, so with the present approach of learner-centred in nature, the teacher has to plan different types of evaluation items, to measure knowledge, understanding, and application, depending on various topics of biology.

So it requires careful planning/design of various types of test items or evaluation items. It has been

recognised that for successful education, the assessment of students must be sensitive to the aims and objectives of curriculum. Examinations are the powerful tools for evaluation of good and bad teaching. The public examinations more often encourage memorisation and repetition of factual biology and not the understanding and application of concepts. Assessment is not merely a part of teaching. It is the central dogma of teaching and it reflects the quality of an educational system. It is an activity that goes more rapidly to the heart of teaching.

However writing good questions needs systematic training. This workshop was organised in order to fulfill this need of the junior college lecturers in the region. It is also one of the objectives of the workshop to prepare key resource persons in the area of biology in question bank preparation, and in the process strengthen the hands of the teachers. Various important aspects like blue print preparation, objective classification of question on the basis of the three major domains, etc.

To write on selected chapters/topics/units all possible types of question written corresponding to various objective levels. And all these levels were given a specific code for each type. This would enable the teachers to appreciate the possibility of testing the learning of a given concept in a variety of ways. This workshop is only a beginning in this direction. Many more such workshops can result in a total Question Bank on topics of the secondary level syllabus, which is followed in the respective states of southern India.

OBJECTIVES OF A QUESTION BANK IN GENERAL

DR. K. DORASAMI

The main function of the question banks would be to make available question bank items to teachers/students and examining bodies together with associated information which they might wish to use in preparing their own tests and examinations during or at the end of the course. There is a criticism against the question banks as it would encourage cramming and production of guide books and answer banks and as such the whole philosophy of a question bank will be misconceived.

Question bank is not a source of easy notes but an aid for teaching. The right question preparation is not only a form of interrogation, but also a form of teaching. Guide books can be written if the number of questions run into hundreds or thousands, but if they are in thousands, such possibilities are remote. At the under-graduate level, there are hundreds of topics in respect of each subject and each one of these can be approached from various angles.

The question banks could be composed of all kinds of questions which are being used for internal assessment and external evaluation ranging from the total 'open' or 'essay' type to the 'closed' or 'objective' type questions. It is necessary, that the question banks must contain a large number of questions/items in a particular subject.

It is expected that question banks would act as a neutral educational and administrative services in picking up some test items for evaluation. It also helps teachers

and examiners to solve some of the problems with large scale examining. It is indeed necessary to look at some of the outcomes of question banks. As outlined earlier, the question banks consist of a large number of different types of questions/items in every subject area with known technical values. Some of the technical values of the questions/items as indicated in the enclosed question banks are:

1. The content points/topic with which it is concerned.
2. The intellectual abilities that the question/item, demands of the students which may be knowledge, comprehension (understanding), application, analysis, synthesis or evaluation.
3. The time required for answering.
4. The type of question/item whether selection or supply.
5. Marks allotted.

How to Use the Question Banks

The present nature of questions/items included in the question bank in the subject area of Biology, were developed by the teachers who have participated in the question bank workshop conducted by RIE, Mysore-6. These questions/items are prevalidated with checklists of criteria for good quality questions/items and provided with basic technical values like:

a. Topic
b. Type of question/item
c. Objectives tested by the question/item
d. Time for answering and
e. Marks allotted, in the form of a blue-print

a. Topic

Topic as identified by the subject teachers.

b. The following types of questions are included in the Question Banks.

Abbreviations used	Expansion
CA	Constant alternative
MC	Multiple choice
SQ	Simple questions
SA	Short answers
VSA	Very short answers
LA	Long answers
TF	True/False
FB	Fill in the blanks
MF	Match the following

Constant alternative

This involves the students to choose an answer from two or more alternatives. The common alternatives are True/False, Yes/No, Agree/Disagree.

Usually a statement is given and the student is asked to choose between True/False. If he considers it "True", he will be asked invariably to mark a (✓) "Tick" against the word true and if he considers it false vice-versa.

Multiple choice

This is the most versatile of objective type test items. The multiple choice items mainly consist of

1. a stem - which is at the top of the item - either a direct question or an incomplete statement.

2. a key - correct answer among options.

3. a set options - usually 3, 4 or 3 alternatives are given, one of these will be the key.

4. distractors - options other than the key in which it is designed.

Multiple choice items involve the students to make a "tick" (√) against the right answer, if there is no separate response sheet supplied.

Simple questions

This term consists of a direct question or a specific direction or a stimulus, which produces a response in the form of a number or a word or a phrase or a sentence.

Short answer

These type of questions call for a very short answer either in the form of a few sentences or a diagram or numerical work or combination of these. The student is given the freedom to choose, organise, and present his answer. The direction of the question must be clear and the scope of the answer must be limited.

Very short answer

Students have been given very limited scope to write more he has to write sharp answers within a short period of time (stipulated time limit).

Further there is a scope for converting one type of question into another. Eg. a multiple choice test item may be converted into a fill-in-the-blank. Few such test items also find place in this question bank.

Long answer

This is the most familiar type of questions commonly known as essay type questions. As far as possible the questions under this category must be kept close ended, clear and unambiguous.

Objectives tested Symbols used	Expansion
K	Knowledge of specific terms, facts, conventions, trends, acquisitions, classification, categories, criteria, methodology, principles, generalisation, theories.
U	Comprehension, translation, interpretation, extrapolation, computing.
A	Application using information in correct situation Application - Problem solving (close ended as well as open ended)
A_1	Analysis of elements and relationships. Analysis of organisation.
S	Skill of drawing Skill of sketching Skill of performing in a situation Skill of labelling an experiment

A question bank is a resource or a pool of test items aimed at a specific objective testing in a specific field and specific category or standard, in our attempts, we could do for both Tamil Nadu and Andhra Pradesh, because from these two states the participation have attended the workshop, we could not do for Kerala and Karnataka as there were no participants from these two states including the union territories too. But our attempt is to make in selected topics, different test items which are of vital

importance to the teachers who are teaching biology and setting papers in their respective states. We have also collected the syllabus from these states and did the content analysis and also collected the old question papers and prepared the test items which were reflected in the question papers and were in accordance with the blue print strength. A model paper was made by the participating teachers in the topics where they developed test items alongwith the blue-print in both Zoology and Botany respectively.

PREPARATION OF 'QUESTION BANK' IN BIOLOGY FOR PLUS TWO TEACHERS OF 'SOUTHERN REGION'

Education is a process and regarded as a UNIVERSAL requirement. Education aims at TOTAL PERSONALITY DEVELOPMENT (All-round Growth and Development) of the child. The development will be in three recognised areas, viz. cognitive domain, affective domain and psychomotor domain. Under cognitive domain the education provides opportunities, for the intellectual growth -acquisition of knowledge, understanding, application and skills required to manipulate and interpret. Changes in the behaviour of the child in terms of attitude, interest and inculcating the desired and socially accepted values covered under affective domain. Achieving perfection in handling, preparation, production and modification, etc. will be in the area of psychomotor domain.

The ultimate aim of education - 'TOTAL PERSONALITY DEVELOPMENT' is achieved through a continuous and systematic

process called TEACHING. Teaching in-turn results in learning. Learning, in simple words, bringing the desirable changes in the behaviour of the child which could be observable and measurable with the innate potential. This potential has been further strengthened by the contributions of environment and mass-media. In hidden potentialities of the child is to be converted into the required competencies/ abilities and capabilities. This major task is shouldered under teaching-learning, an interactive process. Therefore, teaching is a conversion process/modification process of the potentialities of the child into the competencies, to equip the child for his survival, growth and development and to enable him/her to the total culture.

The expected competencies developed through teaching are to be measured periodically, which reflected the ACADEMIC PERFORMANCE/ SCHOLASTIC ACHIEVEMENT of the child. This is done through the testing process. Testing is a component of teaching-learning process. Testing is to test a few/sample competencies developed through the teaching but not all.

Testing discloses/reveals the academic performance of the child in terms of QUANTITY, i.e. numerals/grades. These numerals are the basis for a teacher/institution to convert them into the QUALITY. This is done based on values. The first element of this activity, i.e. awarding marks of grades is valuation. Valuation strengthens the hands of the teachers to offer judgement about the child's progress.

Value judgement is based on the values obtained through valuation. Valuation plus value judgement, within the prevailing norms, leads to EVALUATION.

Evaluation is a comprehensive and continuous process to assess the behavioural changes which includes knowledge, competencies and changes in attitude, aptitude, interests, values and skills.

Evaluation is a sequential process with four stages, viz. input, process, diagnostic and product. In educational terms, these are called the types of evaluation.

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There are two approaches normally followed by the teachers in evaluating the progress of the child namely Oral Evaluation and Written Evaluation. In both the approaches, the teachers are expected to develop certain instruments/ tools to be employed by the teachers to assess the child's performance. These tools are also called as Measuring Instruments.

In oral approach, the teachers normally employ tools like Questioning, Discussion, Debate and more frequently Quiz.

There are two types of questions under Written Evaluation; Free Response and Fixed Response Types. Under free response type of questions, students are free to give their answers on their own, whereas students do not enjoy any freedom but for selecting answers provided by the teachers in fixed response type. Free response type and fixed response type questions are also known as supply type and selective type.

Completion/fill-in the blanks, analogy/correlation type, Very Short Answer type, Short Answer type of 2 marks and 3 marks and Long Answer/Essay type are the tools/ varieties under Free response type of questions. True/False, Matching, Arrangement and Multiple Choice are covered under Fixed response type of questions.

In order to enable the teacher to test the competencies through periodical tests, assignments and examinations, developing a question bank becomes inevitable. Acquainting with framing different types and varieties of questions in a part of teacher's job. Hence the Workshop.

EVALUATION AND MEASUREMENT

DR. MANJULA P. RAO

Definitions

Measurement

* The assignment of numerals to objects or events according to rules.
* Refers to the given quantification of any aspect of instructional process.

Assessment

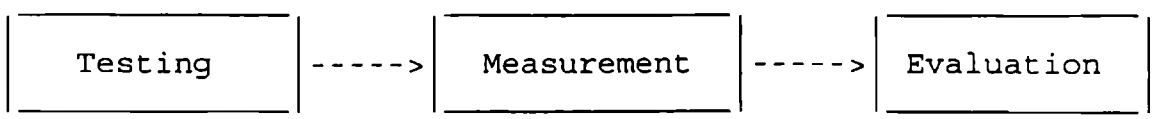
* The practical application of any measurement, the actual performance of some type of measurement.

Evaluation

* Science of providing information for decision making.
* Includes measurement, assessment and testing.
  * Information gathering
  * Information processing
  * Judgement forming
  * Decision making

Testing, Measurement and Evaluation

* Test is used to gather information.
* That information is presented in the form of measurement.
* That measurement is then used to make evaluation.



Types of Decisions

Instructional

Curricular

Selection

Placement or classification

Personal

Types of Educational Tests

Norm Referenced

* Designed to measure individual differences

* Individual scores compared to a reference group

Criterion Referenced

* Designed to determine a student's level of achievement

* Individual score compared to specified criterion

Standardised

* Administered under uniform conditions

* Allow for group comparisons

Teacher Made

* Prepared by classroom teachers

* More flexible

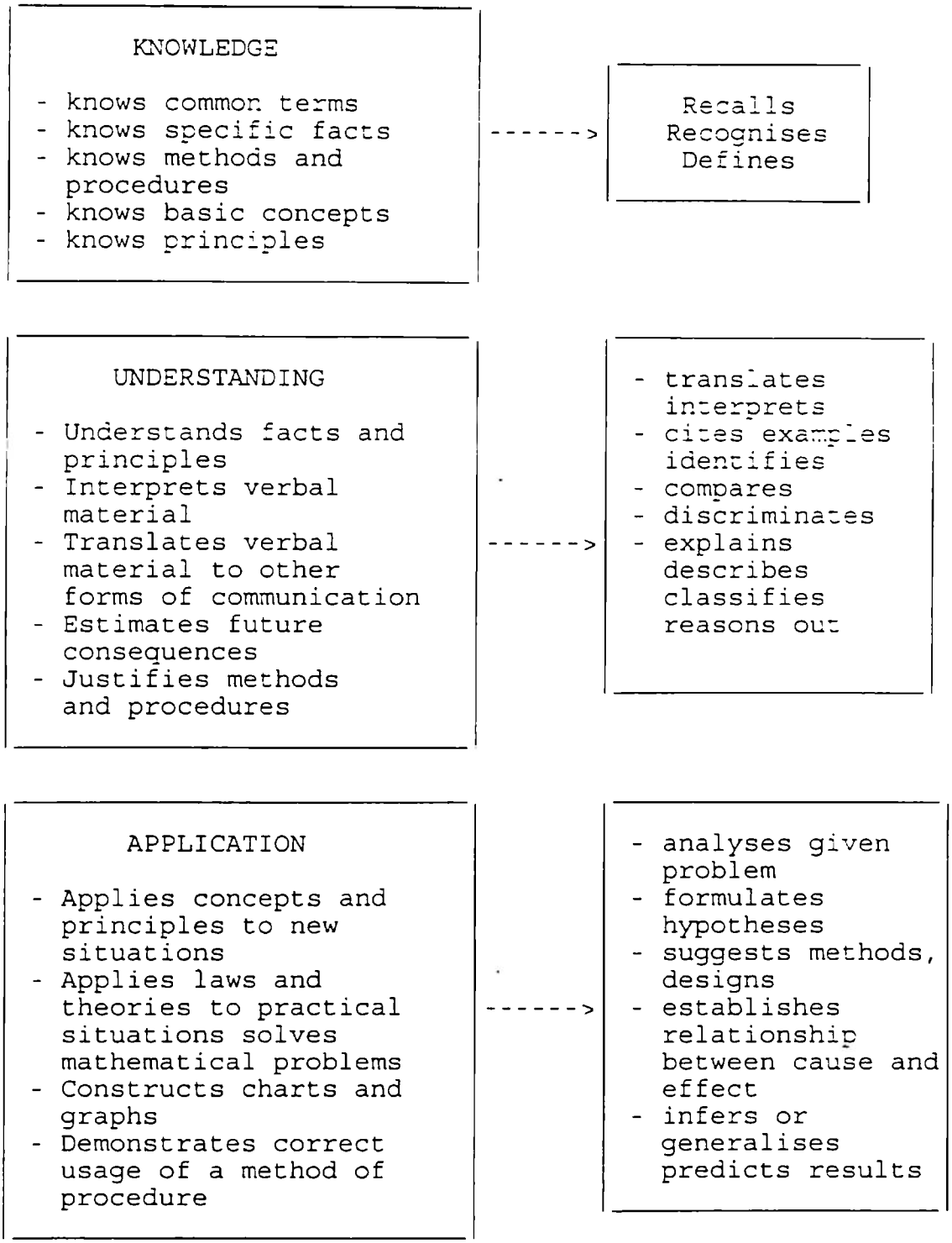
* Do not allow for group comparisons

Bloom's Taxonomy of Educational Objectives in the Cognitive Domain

Category	General Description
I. Knowledge a. of specifics (terminology facts) b. of Ways and Means of Dealing with Specifics (conventions, classifications, criteria,methodology) c. of Universals and Abstractions (principles, generalisations, theories)	Recall of specifics and universals, methods and processes, pattern, structure of setting. Knowledge objectives emphasise most of the psychological processes of remembering.

Category	General Description
II. Comprehension a. Translation b. Interpretation c. Extrapolation	Lowest level of understanding of what is communicated. Can use idea being communicated without necessarily being able to relate it to other ideas or see all its implications.
III. Analysis a. of Elements b. of Relationships c. of Organisational Principals	Breakdown of communication into its constituent parts, such that relative hierarchy of ideas is made clear and/or the relations between the ideas expressed are made clear.
IV. Synthesis a. Production of a unique communication b. Production of plan c. Derivation of a set of abstract relations	Putting together of parts to form a whole; analysing and combining pieces in such a way as to constitute a pattern or structure not clearly there before.
V. Evaluation a. Judgements in terms of internal criteria b. Judgements in terms of external evidence	Making judgements about the value of material and methods for given purposes. Judging extent to which material and methods satisfy given criteria.

Source: Adopted from T.L. Good and J.E. Brophy (Eds) (1986) Educational Psychology, (3rd Ed), New York: Longman.


KNOWLEDGE
- knows common terms
- knows specific facts
- knows methods and procedures
- knows basic concepts
- knows principles
------>
Recalls
Recognises
Defines
UNDERSTANDING
- Understands facts and principles
- Interprets verbal material
- Translates verbal material to other forms of communication
- Estimates future consequences
- Justifies methods and procedures
------>
- translates
interprets
- cites examples
identifies
- compares
- discriminates
- explains
describes
classifies
reasons out
APPLICATION
- Applies concepts and principles to new situations
- Applies laws and theories to practical situations solves mathematical problems
- Constructs charts and graphs
- Demonstrates correct usage of a method of procedure
------>
- analyses given problem
- formulates hypotheses
- suggests methods, designs
- establishes relationship between cause and effect
- infers or generalises predicts results

Objective: Understanding Class XI

Behaviour: Sees Relationship Topic: Bacteria

Which helps the plants in the legume family to possess proteins richer than plants in other families ?

Objective: Understanding Class XI

Behaviour: Compares Topic: Pollination

What four characteristics of insect pollinated flowers make them rather easily distinguishes from the wind pollinated flowers ?

Objective: Understanding Class X

Behaviour: Give Reason Topic: Photosynthesis

Why is photosynthesis at a comparatively low level when plant is in direct sunlight and air is very dry and warm ?

Objective: Knowledge Class X

Behaviour: Recalls Topic: Heredity

A monohybrid cross between F1 hybrid and a recessive parent always yields offsprings in the phenotypic ratio of

a. 1:1

b. 3:1

c. 2:1

d. 3:2

e. 5:2

Objective: Understanding Class XII

Behaviour: Identifies Topic: Taxonomy

Identify the monocot plant from the information given below.

Plant A: Tap root system, reticulate venation, pentamerous flowers.

Plant B: Fibrous root system, parallel venation, trimerous flowers.

TEST ITEMS - SOME EXAMPLES

Objective: Knowledge Class XI

Behaviour: Recalls Topic: Water Relations

A membrane which allows solvent freely and also solute to some extent across against the concentration gradient is called,

a. permeable

b. semipermeable

c. impermeable

d. differentially permeable

Objective: Understanding Class XI

Behaviour: Reasoning Topic: Excretion

There is no glucose in the urine of a healthy person. Yet the amount glucose in the blood leaving the kidney is less than that entering. This is because some of the glucose is,

a. converted into other forms of waste

b. used up by the kidney cells in respiration

c. converted into glycogen in the blood

Objective: Understanding Class XI

Behaviour: Predicts Topic: Heredity

When a black feathered fowl was crossed with a splashed feathered fowl, the resultant hybrids obtained were all,

a. splashed feathered fowls

b. black feathered fowls

c. blue feathered fowls

d. pink feathered fowls

A flower having a dumbel-shaped stigma and a milky latex is included in the family.

a. Asclepiadaceae

b. Labiatae

c. Apocynaceae

d. Sapotaceae

Objective: Application Class X

Behaviour: Predicts Topic: Origin of Life

What happens after a few days if a dead rat is kept in three different flasks, one completely covered with paper, other with gauze and another uncovered ?

a. flies appear in the flask which is not covered

b. flies appear in the flask which is covered with gauze

c. flies appear in the flask which is completely covered with paper

d. flies will not appear in any of the flasks

e. flies appear in all the flasks

Objective: Application Class X

Behaviour: Predicts Topic: Heredity

If the tails of a male and female rat are cut before breeding the offsprings will have

a. no tails at all

b. develop very short tails

c. the end of the tail will be blunt

d. develop tails of normal type

Schedule of Workshop on Development of Question Bank in Biology at Higher Secondary Level of Southern Region

Duration : 10.12.1999 to 17.12.1999
Venue : RIE, Mysore - 6

Day & Date	9 am to 11.30 am		11.45 am to 12.45 pm		2.00 to 3.30 pm		3.45 pm to 5.30 pm
Friday 10.12.99	Registration/ Inauguration	Tea Break	Group Work Approach Paper Presentation/Objectives of the workshop (GVG)	Lunch Break	Group Interaction Lecture on Evaluation & Measurement (PM)	Tea Break	Objectives of the Question Bank/ Concept of Evaluation – GPB
Saturday 11.12.99	Group formation		Selection of Topics (VVA/GVG/SPK/MZS/LS/ GA/GGN)		Group Work I		Group Work
Sunday 12.12.99	Group Work		Group Work		Group Work		Group Work
Monday 13.12.99	Group Work		Group Work		Group Work		Presentation/ Discussion
Tuesday 14.12.99	Group Work		Group Work		Group Work		Group Work
Wednesday 15.12.99	Group Work		Group Work		Group Work		Presentation/ Discussion
Thursday 16.12.99	Blue Print Preparation and Question Paper Setting Lecture on Question Paper Preparation (Prof K Dorasami)				Group Work		Presentation/ Discussion
Friday 17.12.99	Group Work		Group Work		Presentation of final draft by the coordinator		Valedictory Function

MPR - Dr Manjula P Rao; **GPB** - Dr G P Basava Raju; **VVA** - Dr V V Anand; **LS** - Dr L Srikantappa; **GVG** - Dr G V Gopal; **GGN** - Dr Geetha G Nair; **SPK** - Dr S P Kulkarni; **GA** - Dr G Anwar; **MZS** - Dr M Z Siddiqui

BLUE PRINT

I YEAR PRE - UNIVERSITY
BIOLOGY PART - II
TABLE OF SPECIFICATIONS
AND
WEIGHTAGE OF MARKS

Sl. No	OBJECTIVES CONTENT	KNOWLEDGE				UNDERSTANDING			APPLICATION			SKILLS		WEIGHTAGE
		A	B	C	D	B	C	D	B	C	D	C	D	
1.1	INTRODUCTION TO BIOLOGY (4 Hrs)	3				1								05
1.2	DIVERSITY OF ANIMAL LIFE (14 Hrs)		2	1		2	1							16
1.3	TYPESTUDY (5 Hrs)	1	2			1								07
1.4	UNITY OF LIFE (8 Hrs)	1	2				1						1	14
1.5	CELL DIVISION (5 Hrs)		2			1			1					08
														TOTAL = 50

NOTE :

Type of Questions : A = 1 mark - 10 Questions = 10 marks
B = 2 mark - 07 Questions = 14 marks
C = 4 mark - 04 Questions = 16 marks
D = 5 mark - 02 Questions = 10 marks
Toatal Questions 23 50 marks
Options in each type = 4
Grand total = 27 Questions

BLUE PRINT

TABLE OF SPECIFICATIONS FOR PAPER SETTING (TO GIVE WEIGHTAGE CHAPTER WISE) BIOLOGY PART_I - BOTANY CODE NO. 36-1 FIRST YEAR PRE-UNIVERSITY

SL. No	OBJECTIVES CONTENT	KNOWLEDGE				UNDERSTANDING				APPLICATION				SKILL				Weightage
		a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	
1	DIVERSITY OF PLANT LIFE ON EARTH (2 Hrs)	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	4 marks
2	KINGDOM MONERA (4 Hrs)	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 marks
3	KINGDOM PROTISTA (3 Hrs)	1	1	-		-	1	-	-	-		-	-	-	-	-	-	5 marks
4	KINGDOM PLANTAE (22 Hrs)	4	-	3	1	2	1	-	-	-	-	-	-	-	-	-	1	30 marks
5	TAXONOMY OF ANGIOSPERMS (5 Hrs)	2	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	7 marks

Note : a = 1 Marks each, b = 2 Marks each, c = 5 Marks each, d = 5 Marks each.

BOTANY - BLUE PRINT

Time: 3 hours — Max Mars: 100

Sl. No.	Contents	Knowledge				Understanding				Application				Skills				Periods taken	Total marks
		LA	SA	VSA	Obj	LA	SA	VSA	Obj	LA	SA	VSA	Obj	LA	SA	VSA	Obj		
I	A. Vegetative Morphology (i) Root - (1) (ii) Stem - (1) (iii) Leaf - (2) B. Reproductive Morphology (i) Inflorescence - (2) (ii) Flower - (3) (iii) Fruit - (2)			2x1 =2	3x1 =3	1x5 =5		1x1 =1	2x1 =1			1x1 =1	1x1 =1			2x1 =2		13	17
II	Taxonomy of Angiospers (i) Principles - (1) (ii) Fabaceae - (2) (iii) Asteraceae - (2)			3x1 =3				2x1 =2					2x1 =2					7	9
III	Anatomy (i) Tissue - (2) (ii) Tissue systems - (1) (a) Meristematic - (2) (b) Permanent - (2)		2x2 =4				2x2 =4	1x1 =1									1x1 =1	8	10
IV	Anatomy (i) Root (dicot and monocot) - (2) (ii) Stem (dicot and monocot) - (2) (iii) Leaf (dicot) - (1)		2x2 =4					2x1 =2									2x1 =2	6	8
V	Plant Physiology (i) Plant water relations - (1) (ii) Photosynthesis - (6) (iii) Respiration - (6) (iv) Growth (phytoharmones) - (4)	1x5 =5	2x2 =4	4x1 =4				3x1 =3		1x5 =5	2x2 =4						5x1 =5	23	30
VI	Cell Biology (i) Ultra structure of a plant cell and organelles - (1) (ii) Cell division - (4)				2x1 =2	1x5 =5											3x1 =3	8	10
VII	Plant Ecology (i) Ecosystem - (6) (ii) Plant communities - (6) Extra periods - (2)		2x2 =4	3x1 =3	2x1 =2		2x2 =4		3x1 =3									13 2	16
Total periods taken																		80	-
Total number of questions		1	8	12	7	2	4	9	5	1	2	1	3	-	-	4	11	70	-
Total number of marks		5	16	14	5	10	8	9	5	5	4	1	3		-	4	11	100	100

BLUE PRINT - ZOOLOGY

Time: 3 hours

Max Mars: 100

Sl. No.	Content	Knowledge			Understanding			Application			Skill			Periods taken	Total marks
		LA	SA	OO	LA	SA	OO	LA	SA	OO	LA	SA	OO		
I	General characters and classification of Pisces, Amphibia and Reptilia	-	(2)2 =4	(2)1 =2	-	(1)2 =2	(2)1 =2	-	-	-	-	-	-	7	10
II	Structural and functional organisation of chordatis with reference to frog and man	(1)5 =5	(4)2 =8	(4)1 =4	(1)5 =5	(3)2 =6	(2)1 =2	(1)5 -5	(2)2 =4	(4)1 =4	(1)5 -5	(1)2 =2	-	24	40
III	Embryology of Amphioxus and frog	(1)5 =5		(2)1 =2		(1)2 =2	(1)2 =1			(2)1 =2				7	12
IV	Genetics - Mendelism sex determination sex linked inheritance ploidy - mutation blood groups		(2)2 =4		(1)5 =5		(2)1 =2			(2)1 =2				7	11
V	Environment in relation to human welfare pollution, communicable disease, immunity, food, air, water borne diseases non-communicable disease metabolic disorders		(2)2 =4		(1)5 =5	(1)2 =2				(4)1 =4				8	15
Total		10	20	8	15	12	7	5	6	12	5	2	-	53	100

ANNEXURE-I

SCHEME OF EXAMINATION

ANDHRA PRADESH

Intermediate Examination (I year and II year)

Inclusive of Theory + Practicals

I year 60 + No. of practicals

(I and II year contents)

II year 60 + 30

Zoology 150

Botany 150

SCHEME OF EXAMINATION

TAMIL NADU

Biology - Theory: 150 and Practical: 50

Botany - 75 + II year 25 (10 internal and 15 external)

Zoology - 75 + 25 (10 internal and 15 external)
(5+5)

BIOLOGY

BOTANY

(TAMIL NADU)

Time: 1.5 hours Max. Marks: 75

Content	O	SA	LA	E
Morphology	(1) 3	(2) 2	-	(10) 1
Taxonomy	(1) 4	(2) 3	(5) 1	(10) 1
Anatomy	(1) 2	(2) 2	(5) 1	(10) 1
Genetics Bio-tech	(1) 2	(2) 2	(5) 1	-
Physiology	(1) 4	(2) 3	(5) 2	(10) 1
	15	12	5	4

BOTANY

WEIGHTAGE TO OBJECTIVES

(TAMIL NADU)

Sl. No.	K	U	A	S	Total marks
I Reproductive Morphology (Vegetative Morphology)	5	8	2	2	17
II Taxonomy of Angiosperms	3	2	2	2	9
III Anatomy	4	5	0	1	10
IV Anatomy	4	2	0	2	8
V Plant Physiology	13	3	9	5	30
VI Cell Biology	2	5	0	3	10
VII Plant Ecology	9	7	0	0	16
Total	40	32	13	15	100

II PUC BIOLOGY (ZOOLOGY)

Time: 3 hours Max. Marks: 100

A. WEIGHTAGE TO THE CONTENT

Sl. No.	Content	Marks
I	General characters and classification of Pisces, Amphibiia and Reptilia	
II	Structural and functional organisation of chordates with reference to frog and man	
III	Embryology of Amphioxus and frog	
IV	Genetics - Mendelism - sex determination - sex linked inheritance ploidy - mutation - blood groups	
V	Environment in relation to human welfare - pollution - communicable diseases - immunity - food and water borne - air borne vector borne diseases - non-communicable diseases - metabolic disorders	

B. WEIGHTAGE TO THE INSTRUCTIONAL OBJECTIVES

Sl. No.	Content	K	U	A	S	Marks
I	General characters and classification of Pisces, Amphibia and Reptilia	6	4	-	-	10
II	Structural and functional organisation of chordates with reference to frog and man	17	13	13	7	50
III	Embryology of Amphioxus and frog	7	3	2	-	12
IV	Genetics - Mendelism - sex determination - sex linked inheritance ploidy - mutation - blood groups	4	7	2	-	13
V	Environment in relation to human welfare - pollution - communicable diseases - immunity - food and water borne - air borne vector borne diseases - non-communicable diseases - metabolic disorders	4	7	4	-	15
Total		38	34	21	7	100

Regd. No. | | | | | | | |

Part III - Biological Sciences

Zoology - Paper-I

(Telugu Version)

Time : 3 Hours] [Max. Marks : 60

ఈ క్రింది సూచనలను జాగ్రత్తగా చదవండి.

i. అన్ని ప్రశ్నలకు సమాధానము తప్పనిసరిగా వ్రాయాలి.

ii. క్రమ సంఖ్య 1 నుండి 18 వరకు గల ప్రశ్నలు 'అతిస్వల్ప' సమాధాన తరహావి. ఒక్కొక్క ప్రశ్నకు ఒక్క మార్కు. ప్రతి సమాధానము ఒక పదము, ఒక పదబంధం లేక ఒక వాక్యమునకు పరిమితము. ఈ ప్రశ్నలన్నించిని ఒక దాని తరువాత ఒకటి అదే వరుస క్రమంలో సమాధానాలు వ్రాయలి. లేనిచో అవి దిద్దబడవు.

iii. క్రమ సంఖ్య 19 నుండి 28 వరకు గల ప్రశ్నలు 'స్వల్ప' సమాధాన తరహావి. ఒక్కొక్క ప్రశ్నకు మూడు మార్కులు. ప్రతి సమాధానము 50 నుండి 60 పదాలకు పరిమితము.

iv. క్రమ సంఖ్య 29 నుండి 30 వరకు గల ప్రశ్నలు 'దీర్ఘ' సమాధాన తరహా. ఒక్కొక్క ప్రశ్నకు ఆరు మార్కులు. ప్రతి సమాధానము 250 పదాలకు పరిమితము.

v. అడగనిదే పటము గీయనవసరము లేదు.

I.

1. పిండాభివృద్ధి దశలో ఏర్పడిన ఆది తంత్రరంధ్రము ప్రౌఢ దశలో నోరుగా మారే జీవుల సమూహాన్ని ఏమంటారు?

2. మిధ్యావాయునాళాలు ఏ జీవిలో వుంటాయి?

3. నులి పురుగులు కలుగజేసే వ్యాధి పేరు ఏమి?

4. ఏ వర్గంలోని జీవులు ప్రౌఢదశలో వలయ సౌష్ఠవాన్ని, డింభక దశలో ద్విపార్శ్వ సౌష్ఠవాన్ని ప్రదర్శిస్తాయి?

5. ఒక విద్యార్థికి పరిశీలనకై గాజు సీసాలో వుంచబడిన ఒక జీవి యివ్వబడింది. ఆ జీవి స్థూపాకారంగా వుండి, ఖండీభవనాన్ని చూపిస్తూ, ప్రతి ఖండితానికి రెండు జతల కాళ్ళను కలిగి వుంది. ఆ జీవి ఏ విభాగానికి చెందినదో వ్రాయుము?

6. బొద్దింకలో విసర్జన క్రియకు ఉపయోగపడే నాళికలు ఏవి?

7. ఒక జీవి ప్రమాద సమయంలో తన ప్రావార కుహరంలో గల మషీరగోణిలోని వర్ణక పదార్థాన్ని విడుదల చేసి, దాని మరుగున తప్పించుకొనింది. ఆ జీవి ఏ విభాగానికి చెందినదో ఊహించుము.

8. వానపాము ఉభయలైంగికము ఐనప్పటికి దానిలో ఆత్మ ఫలదీకరణ జరుగదు. ఎందుచేత?

9. ఎంటమీబా హిస్టాలిటికా కలుగజేసే వ్యాధి ఏది?

10. బొద్దింక శాబకంలో ఏ హార్మోను లోపంవల్ల నిర్మోచనము జరుగదు?

11. శ్లేష్మ, శ్వేతక పదార్థాలను స్రవించి, గుడ్డతిత్తి నిర్మాణంలో ఉపయోగపడు వానపాము శరీర భాగము ఏది?

12. వానపాములో గల సంవృత, బాహ్య వృక్కాలు ఏవి?

13. బొద్దింక కాలుల్లో ఐదు భాగములు కలవు. వాటిలోని మూడవ భాగము పేరేమి?

14. ఒక వానపాము నున్నటి గాజు ఫలకంపై చలించేటప్పుడు కూడా అధానికి అతుక్కోకుండానే కదులుతూ వుంది. మరి అది ఏ నిర్మాణ సహాయంతో చలిస్తూ వుంది.

15. ఎలిఫెంటియాసిస్ అనే వ్యాధిని కలుగజేసే పరాన్న జీవి ఏది?

16. బొద్దింకలో ఏ కణాలు పెరిట్రాఫిక్ త్వచాన్ని స్రవిస్తాయి?

17. మీరు చదివిన ఏ జీవి యొక్క జీర్ణక్రియా విధానంలో అటు ప్రోటోజోవా జీవులలో జరిగే కణాంతస్థ జీర్ణక్రియ, యిటు మెటాజోవ జీవులలో జరిగే కణబాహ్య జీర్ణక్రియా పద్ధతులు రెండూ వున్నాయి?

18. ఆడ అనాఫిలస్ దోమ జీర్ణకోశంలో ప్లాస్మోడియం యొక్క సంయోగ బీజమాత్రకలు అభివృద్ధి చెందటానికి కారణమేమి?

II.

19. ఒక ప్రయోగంలో బొద్దింకలోని శ్వాసరంధ్రాలు మూసి వేయబడ్డాయి. దాని వల్ల కుంటుపడే క్రియ పేరు తెలిపి, ఆ క్రియా విధానాన్ని వివరించుము?

20. గుచ్చి, పీల్చే ముఖభాగాలను వివరించి. అవి కలిగివున్న కీటకము యొక్క ఆహార సేకరణకు అవి ఏవిధంగా తోడ్పడతాయో వ్రాయండి?

21. ద్వితీయ అకశేరుక అతిధేయిని కలిగిన మూడు ప్రోటోజోవన్ పరాన్న జీవుల పేర్లు పేర్కొని, అవి కలిగించే వ్యాధులు మరియు ఆ అతిధేయుల పేర్లు వ్రాయుము?

22. వానపాములో విసర్జక క్రియకు తోడ్పడే కణాలను గురించి వ్రాయుము?

23. మీరు చదివిన హెల్మెంథ్ పరాన్న జీవులలో ఒక పరాన్నజీవికి నత్త మాధ్యమిక అతిధేయి. ఆ పరాన్నజీవి యొక్క జీవిత చరిత్రను వివరించుము?

24. బొద్దింకలోని నేత్రాంశ నిర్మాణమును పటము సహాయంతో వివరించండి?

25. వానపాములో జరిగే పిండాభివృద్ధిని వివరించుము?

26. పాలిప్, మెడ్యుసాల మధ్యగల ఆరు భేదాలను వ్రాయండి.

27. సముద్ర నక్షత్రములోని జల ప్రసరణ వ్యవస్థ పటము గీచి, భాగములను గుర్తించుము.

28. పారమీషియమ్ యొక్క పటమును గీచి, భాగములను గుర్తించుము.

III.

29. నిడేరియా వర్గపు సాధారణ లక్షణాలను వివరించి, తరగతుల వరకు దాని వర్గీకరణను గురించి వ్రాయుము.

లేదా

వర్గము అనెలిడ యొక్క వర్గీకరణను ఉదాహరణములతో వివరించుము.

30. ఆస్కారిస్ జీవిత చరిత్రను వివరించి, దాని వలన మానవునికి కలిగే రోగ చిహ్నాలను, దాని నివారణోపాయములను గూర్చి వ్రాయుము?

లేదా

హైడ్రాయొక్క లైంగిక ప్రత్యుత్పత్తి అవయవములను ఫలదీకరణ, అభివృద్ధిని గురించి వ్రాయుము.

# # # #

632

Total No. of Questions – 30

Total No. of Printed Pages – 3

Regd. No. | | | | | | | |

PART III

Biological Sciences

ZOOLOGY - Paper - II

(Telugu Version)

Time : 3 *Hours* *Max. Marks* : 60

గమనిక : ఈ క్రింది సూచనలను జాగ్రత్తగా చదవండి.

i) అన్ని ప్రశ్నలకు సమాధానాలు తప్పనిసరిగా వ్రాయాలి.

ii) క్రమ సంఖ్య 1 నుండి 18 వరకు గల ప్రశ్నలు ''అతిస్వల్ప'' సమాధానతరహావి. ఒక్కొక్క ప్రశ్నకు ఒక్క మార్కు. ప్రతి సమాధానము ఒక పదము, ఒక పదబంధము ఒక వాక్యమునకు పరిమితము. ఈ ప్రశ్నలన్నింటిని ఒకదాని తర్వాత ఒకటి అదే వరుస క్రమములో సమాధానాలు వ్రాయాలి. లేనిచో అవి దిద్దబడవు.

iii) క్రమ సంఖ్య 19 నుండి 28 వరకు గల ప్రశ్నలు ''స్వల్ప'' సమాధాన తరహావి. ఒక్కొక్క ప్రశ్నకు మూడు మార్కులు. ప్రతి యొక్క సమాధానము 50 నుండి 60 పదాలకు పరిమితము.

iv) క్రమ సంఖ్య 29 మరియు 30 గల ప్రశ్నలు ''దీర్ఘ'' సమాధాన తరహావి. ఒక్కొక్క ప్రశ్నకు ఆరు మార్కులు. ప్రతి సమాధానము 250 పదాలకు పరిమితము.

v) అడగనిదే పటము గీయనవసరము లేదు.

I. 1. కార్డేటా జీవులు ఆరిక్యులేరియా డింభక జీవినుండి పరిణామం చెందాయి అని ప్రతిపాదించిన శాస్త్రవేత్త ఎవరు?

2. ఏ క్రమానికి చెందిన ఉభయజీవులు 'నియోటనీని' ప్రదర్శిస్తాయి.

3. లాలాజల గ్రంధులలోని ఉపకళాకణజాలము ఏది?

4. జీవ పరిణామ వాదానికి లిఖిత పూర్వక నిదర్శనాలు ఏవి?

5. మతిభ్రమ, దృష్టిమాంద్యము, చెముడు, ఎముకలకు హాని మొదలైన వాటికి కారణమైన రసాయనము ఏది?

6. మంచినీటి సారచేపయొక్క శాస్త్రీయ నామాన్ని పేర్కొనండి.

7. ఏరకానికి చెందిన చేపల పేగులో సర్పిలాకార కవాటం ఉంటుంది?

8. 'సరీసృపాల స్వర్గముగంగా' ఏ మహాయుగాన్ని పేర్కొంటారు.

9. కప్ప ఘ్రాణాంగము యొక్క అంగుల్యా స్థుల సాంకేతికము వ్రాయుండి.

10. ఆధార కణజాలాలు ఏ జనన స్తరం నుండి ఉద్భవిస్తాయి

11. రేఖిత కండర తంతువుల కట్టను ఏమని పిలుస్తారు.

12. ద్విసంకర సంకరణ జన్యురూప నిష్పత్తిని పేర్కొనుము.

13. గంగానదీజలాల కాలుష్యనివారణను చేపట్టిన ప్రాజెక్టు పేరు?

14. ఇండియాలో కోళ్ళ పరిశ్రమ స్థాపనలో ప్రథమ స్థానం పొందిన రాష్ట్రం ఏది?

15. సాబ్జెను చేపలు పట్టడానికి ఉపయోగించు వలలు ఏవి?

16. ఒక ప్రయోగంలో కప్ప మెదడులో అత్యధిక భాగం తొలగించడం జరిగింది. అయినప్పటికి గుండె, శ్వాసక్రియ మామూలుగా పనిచేయడం జరిగింది. అంటే కప్ప మెదడులో ఏ భాగం మిగిలి ఉన్నది?

17. కండర సంకోచానికి అవసరమైన అయాన్లు ఏవి?

18. ఎడుమైవ మూత్రపిండాలు, ఊపిరితిత్తులు, బీజకోశాలు చిన్నవిగా ఉండే సరీసృపాల సముదాయము. ఏది?

II. 19. ఒక కాలేజీ మైదానములో ఒక పాము చంపబడినది.అది జంతుశాస్త్ర ప్రయోగశాలకు తీసుకురాబడింది. అక్కడ అది నాగుపాముగా గుర్తించబడింది. విషసర్పాల విశిష్టలక్షణాల పరిజ్ఞానం ఆధారంగా పై విషయాన్ని ధృవపరచండి.

20. కప్ప శోషరస వ్యవస్థను వర్ణించండి.

21. కప్ప, అస్థిపంజర కండరాన్ని వర్ణించండి.

22. అసంపూర్ణ బహిర్గతత్వాన్ని ఉదాహరణద్వారా వివరించండి.

23. భారతదేశంలో ఆహారంగా ఉపయోగపడే మూడు ముఖ్యమైన మంచినీటి చేపలను వర్ణించండి.

24. కప్ప పురుష జననేంద్రియ వ్యవస్థను వర్ణించండి.

25 వాయు కాలుష్యంలో CO మరియు SO_2 ల పాత్రను వివరించండి.

26. జీవపరిణామ సిద్ధాంతానికి నిదర్శనాలు ఆధారంగా ఉపయుక్త వికిరణము, అభిసారి పరిణామమును వివరించండి.

27. కప్ప వృక్క ప్రమాణము పటము గీసి భాగములు గుర్తించండి.

28. కప్ప కశేరునాడీదండము అడ్డుకోత పటముగీసి భాగములు గుర్తించండి.

III 29. కప్ప - మెదడు నిర్మాణము, విధులు వ్రాయండి.

లేదా

కప్పలో వివిధ రకాల శ్వాసక్రియలను వర్ణించండి.

30. ఉపకళాకణ జాలమును వర్ణించండి.

లేదా

జీవపరిణామ సిద్ధాంతానికి, పిండోత్పత్తిశాస్త్రంనుండి లభ్యమయ్యే నిదర్శనాలు పేర్కొనండి.

Register Number | | | | | | |

Part III — Optional Subjects

BIOLOGY

(English Version)

Time Allowed : 3 Hours] [Maximum Marks : 150

N. B. : Candidates should answer **Part - I** (Botany) & **Part - II** (Zoology) in separate answer-books.

PART - I (BOTANY)

(Marks : 75)

SECTION - A

Note : i) Answer *all* questions.

ii) *All* questions carry equal marks. 15 × 1 = 15

I. Choose and write the correct answer :

1. Nepenthes adopts insectivorous nutrition to get required amount of

   a) carbon

   b) nitrogen

   c) phosphorus

   d) protein.

2. Floral formula of the female flower of Musa paradisiaca is

   a) Br, ebrl, %, ♂ , P_{3+3} , A_{3+3} , $\overline{G}_0$

   b) Br, %, ♀ , K_{α} , $C_{(5)}$, A_0 , $\overline{G}_{(2)}$

   c) Br, ebrl, %, ♀ , P_{3+3} , A_0 , $\overline{G}_{(3)}$

   d) Br, ♀ , P_0 , A_0 , $\underline{G}_{(3)}$.

[Turn over

3. Water conducting cells of Pteridophytes and Gymnosperms are

   a) xylem vessels

   b) xylem fibres

   c) sieve elements

   d) xylem tracheids.

4. Which one is gene mutation ?

   a) Insertion

   b) Duplication

   c) Inversion

   d) Translocation.

5. Find out the natural auxin found in higher plants.

   a) I.A.A.

   b) 2, 4-D

   c) GA_2

   d) Zeatin.

6. A large amount of transpirational water loss occurs through

   a) cuticle

   b) hydathode

   c) lenticel

   d) stomata.

II. Fill in the blanks :

7. In epiphytes the rain water is absorbed by a special type of tissue called ..... .

8. ..... type of stamen is one in which anthers are united and filaments are free.

9. A collection of individual plants resembling one another in all characters is ..... .

10. Each stoma is surrounded by bean shaped cells called ..... .

11. The ability of every living plant cell to produce the entire plant is called ..... .

12. The pigment system responsible for light reaction occurs in the ..... of chloroplasts.

III. Match the following :

13.	Juicy edible part of jackfruit	a)	$NADPH_2$
14.	Herbarium	b)	thalamus
15.	Photosynthesis	c)	kew
		d)	perianth
		e)	RUBP.

SECTION – B

Note : i) Answer any *ten* questions.

ii) *All* questions carry equal marks.

iii) Each answer should be in *one* or *two* sentences. $10 \times 2 = 20$

16. Mention any two differences between racemose inflorescence and cymose inflorescence.
17. Define "pinnae". How do they differ from simple leaves ?
18. Give two differences in the ovaries of Euphorbiaceae and Musaceae.
19. Define 'plant taxonomy'.
20. Explain monocarpic plant.
21. What is an 'endarch xylem' ?
22. What are 'bast fibres' ? Mention its commercial importance.
23. Define 'epistasis'.
24. What are 'molecular scissors' ? Give example.
25. What is osmosis ?
26. Define 'Guttation'.
27. What is 'Calvin's Cycle' ?

SECTION – C

Note : i) Answer any *four* questions.

ii) *All* questions carry equal marks.

iii) Each answer should not exceed 100 words. $4 \times 5 = 20$

28. Define dry fruits. Explain its various types.

29. Give any five economical importances of family Asteraceae.

30. Explain the various types of meristems.

31. What is 'test cross' ? Explain it with an example.

32. List out the physiological effects and practical applications of 'Cytokinins'.

33. Explain 'photophosphorylation'.

SECTION - D

Note : i) Answer *all* questions.

ii) Both the questions carry equal marks.

iii) Each answer should not exceed 200 words. 2 × 10 = 20

34. What is Phyllotaxy ? Describe various types of phyllotaxy with examples. Add a note on the function of the leaf.

OR

Describe the floral characters of family *Fabaceae* with diagrams. Draw its floral diagram. Write floral formula.

35. Describe the primary structure of a dicot root with diagram.

OR

Describe the reactions of Glycolysis.

PART - II (ZOOLOGY)

(Marks : 75)

SECTION - A

Note : i) Answer *all* questions.

ii) *All* questions carry equal marks. 15 × 1 = 15

I. Choose and write the correct answer :

1. Deficiency of Vitamin *D* leads to

a) Xerophthalmia

b) Nyctalopia

c) Osteomalacia

d) Beriberi.

2. The ascending limb of Henle's loop gives rise to a coiled structure known as

   a) distal convoluted tubule

   b) glomerulus

   c) proximal convoluted tubule

   d) collecting tubule.

3. The outer surface of the entire central nervous system is covered by a thin closely adherent membrane called

   a) Dura mater

   b) Arachnoid membrane

   c) Pia mater

   d) Cistern.

4. Genic balance theory was studied in Drosophila by

   a) Mendel

   b) T. H. Morgan

   c) Calvin B. Bridges

   d) Hugo-de-Vries.

5. Equal holoblastic cleavage is found in

   a) frog

   b) amphioxus

   c) hen

   d) insect.

II. Fill in the blanks :

6. Blood pressure is measured by an instrument with the help of a stethoscope called ..... .

7. Trachea is internally lined by ..... epithelium.

8. Loss of one or more chromosome from diploid ($2n$) set of chromosomes of an organism causes ..... .

9. Amoebiasis is caused by the infection of ..... protozoan parasite.

10. Drug used for effective killing of microfilaria is ..... .

11. Seminiferous tubules are found in ..... .

12. One of the harmful mutations in man is ..... .

5031

III. **Match the following :**

13.	Down's syndrome	a)	Giardia
14.	Oogenesis	b)	Salmonella
15.	Typhoid	c)	Mongolism
		d)	Breeding
		e)	Polar bodies.

SECTION – B

Note : i) Answer any *ten* questions.

ii) *All* questions carry equal marks.

iii) Each answer should be in *one* or *two* sentences. $10 \times 2 = 20$

16. What is dead space ?
17. Where is thymus gland situated ?
18. What is reflex arc ?
19. Define enzyme.
20. Define law of segregation.
21. Define Bleeder's disease.
22. Define multiple alleles.
23. What is cleavage ?
24. What are called cledoic and non-cledoic eggs ?
25. Explain Western Blot-test.
26. What is acid rain ?
27. What is passive acquired immunity ?

SECTION – C

Note : i) Answer any *four* questions.

ii) *All* questions carry equal marks.

iii) Each answer should not exceed 100 words. $4 \times 5 = 20$

28. What happens to the food in the mouth ?
29. Write short notes on the hormones secreted in the neurohypophysis.

30. Write short notes on Eugenics.

31. Explain the cleavage of Amphioxus.

32. Define Zoonoses and classify with examples.

33. Explain Alcoholism and Drug abuse.

SECTION - D

Note : i) Answer *all* questions.

ii) Both the questions carry equal marks.

iii) Each answer should not exceed 200 words. $2 \times 10 = 20$

34. Describe with diagram, the structure of the spinal cord of man.

OR

Enumerate the functions of the brain.

35. Describe how sex is determined in human beings and in Bonellia worm.

OR

Tabulate any five air-borne diseases, their causative agents and symptoms.

MODEL QUESTION PAPER WITH EFFECT FROM 1999-2000

PART III - BIOLOGICAL SCIENCES

BOTANY - PAPER-I

(ENGLISH VERSION)

Time: 3 hours Max. Marks: 60

NOTE: Read the following instructions, carefully.

1. In Section A, questions from Sl.No. 1-3 are of long answer type. Each question carries 8 marks. Every answer may be limited to 300 words.
2. In Section B, questions from Sl. No. 4-12 are of short answer type. Each question carries 4 marks. Every answer may be limited to 75 words.
3. In Section C, questions from Sl. No. 13-27 are of short answer type. Each question carries 2 marks. Every answer may be limited to 2-3 sentences.
4. DRAW LABELLED DIAGRAMS WHEREVER NECESSARY

SECTION-A

Answer any TWO of the following: Marks: 2x8 = 16

1. Describe the internal structure of a primary Dicot stem.
2. What is inflorescence ? Describe different recemose types with suitable examples.
3. Describe the essential organs of the flower in the families Malvaceae and Asteraceae.

SECTION-B

Answer any SIX of the following: Marks: 6x4 = 24

4. Write about the sample tissues which help in mechanical support.
5. Describe the trap mechanism of any two Insectivorous plants.
6. In which family you will find the Corolia showing descendingly imbricate aestivation. Explain its structure.
7. Differentiate aggregate fruits and multiple fruits with examples.
8. Which organel is responsible for the synthesis of $C_6H_{12}O_6$? Describe its structure in brief.
9. Explain the substage of Melosis in which crossing over takes place.
10. How do you identify the underground stems ? Describe any two types of underground stems.
11. Describe any four types of contrivences for cross pollination.
12. What are Autotrophs and Heterotrophs ? Give examples.

SECTION-C

Answer any TEN of the following: Marks: 10x2 = 20

13. Give the structure and functions of stomata.
14. Differentiate between ephemerals and annuals with examples.

15. How does Calyx modify in Asteraceae ? Mention its function.
16. What is the difference between Prokaryotes and Eukaryotes ?
17. How M.S. Swaminadhan is responsible for Green Revolution in India ?
18. What happens when the Mitochondria of cell are damaged ?
19. What is double fertilisation ?
20. If you are given a Bryophyllum leaf, can you propagate plants from it without using tissue culture method. If so, why ?
21. Why the flower of a Solanaceae is partially Zygomorphic?
22. A Somatic cell of an Angiospermic plant has 16 chromosomes. How many chromosomes are present in an egg cell and an endosperm cell. Substantiate your answer.
23. Interphase is not a resting phase in cell cyclem why ?
24. Suppose you are given a Citrus leaf and Hibiscus leaf, which one do you consider a compound leaf ? Why ?
25. A transverse section of a plant shows four vascular bundles. Identify and explain the orientation of Xylem in it.
26. What are suicidal bags ? Why they are called so ?
27. One of the two male gametes in the pollen tube is destroyed. What happens if it enters into the mature embryro sac ?

DESIGN

QUESTION PAPER/UNIT TEST:

Subject : Botany

Paper : I

Class : I.P.E. 1st year w.e.f. 1999-2000

Time : 3 hours

Max. Marks : 60

1. WEIGHTAGE OF OBJECTIVES

Objective	Knowledge	Understanding	Application	Total
Percentage of marks	35	43	22	100
Paper marks	32	38	20	90

2. WEIGHTAGE TO FORM OF QUESTIONS

Form of questions	Essay	Short answers	Very Short Answers	Total Questions
Number of questions	2/3	6/9	10/15	18/27
Marks allotted	16/24	24/36	20/30	60/90

3. WEIGHTAGE TO CONTENT: UNITS/SUB-UNITS

	Marks
1. (a) World of plant life (b) National Institutes and Botanists of India	08
2. Fundamental unity in plant life	16
3. Plant form and development	34
4. Classification of flowering plants	16
5. Internal organisation of plants	16
Total	90

4. SCHEME OF SECTIONS

A = Essay questions (300 words)

B = Short answer questions (75 words)

C = Very short answer questions (in 2 or 3 sentences)

5. SCHEME OF OPTIONS

2/3 open choice

6. DIFFICULTY LEVEL

Difficulty = 22%

Average = 43%

Easy = 35%

BLUE PRINT (Effective from 1999-2000)

Subject: Botany
Paper-I

Time: 3 hours

Class: I Year Intermediate
Max. Marks: 60

Sl. No.	OBJECTIVES: Units or sub/units / Form of questions	KNOWLEDGE E	KNOWLEDGE SA	KNOWLEDGE VSA	UNDERSTANDING E	UNDERSTANDING SA	UNDERSTANDING VSA	APPLICATION E	APPLICATION SA	APPLICATION VSA	Skill	Total
1	World of plant life (b) National Institutes and Botanists of India		4(1)				2(1)			2(1)	Spread all over the	
2	Fundamental only in plant life					4(2)	2(1)			2(1)		
3	Plant form and development		8(1)	4(1)		4(3)	2(1)			2(4)		34
4	Classification of flowering plants		8(1)			4(1)	2(1)			2(1)		16
5	Internal organisation of plants		8(1)			4(1)	2(1)			2(1)		16
SUBTOTALS			8(3)	4(2)		4(7)	2(5)			2(1)		
TOTAL			32			38			20			90

Note: Figures within brackets indicate the number of questions and figures outside the bracket indicate marks. This Blue Print is specific for the model question paper given here. The paper setter is free to change the Blue Print for setting question paper without deviating from control weightage.

Summary: Essay (E) No. 3: Marks - 24
Short answer (SA) No. 9: Marks - 36
Very short answer (VSA) No.15: Marks - 30

Scheme of options: 2/3 open choice in all the three sections

Scheme of sections: Three Sections - A(E), B(SA) and C(VSA)

EVALUATION ITEMS IN BOTANY

EVALUATION ITEMS IN BOTANY

UNIT I : PLANT PHYSIOLOGY

TOPIC 1 : WATER RELATIONS OF PLANTS

CONTENT POINTS:

1. Water is a universal solvent. Water is essential for life, physiologically 90 to 95% of protoplasm is composed of water, water is essential for the maintenance of physiological process in plant cell, like, imbibition, osmosis and diffusion.

2. Importance of water to plants

3. Phenomenon of Osmosis

4. Meaning, understanding of terms like diffusion, water potential, imbibition, plasmolysis

5. Absorption of water - water absorbing organs - mechanism of water absorption (lateral)

6. Ascent of sap - Mechanism - Vital theories, root pressure theory - Physical theories (cohesion tension -theory)

7. Transpiration - Meaning - Experiment - Concept of soil - plant - Atmosphere continum, places of occurrence, structure of stomata - opening and closing of stomata - factors affecting transpiration - guttation

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	A	A fresh grape fruit when sunk in a salt solution, loses turgidity after some time. Why ? A) Plasmolysis B) Diffusion C) Imbibition D) None of these	A
2	A	Excessive use of fertilizers causes death of plant cells due to A) Endosmosis B) Exosmosis C) Imbibition D) Turgidity	B

Q. No.	Obj.	Questions	Answers
3	U	Osmosis means A) Flow of solute from low concentration to higher concentration B) Flow of solute from higher concentration to lower concentration C) Flow of solvent from lower concentration solution to higher concentration solution across a semi-permeable membrane D) Flow of solvent from higher concentration solution to lower concentration solution	C
4	K	Plasma membrane is A) Impermeable B) Selectively permeable C) Non-selectively permeable D) None of these	B
5	U	Seeds swell when placed in water due to A) Osmosis B) Imbibition C) Hydrolysis D) Plasmolysis	B
6	U	Choose the correct statement A) Cell wall is completely permeable B) Cell wall issemi-permeable C) Cell wall is impermeable D) Cell wall does not react to permeability	A

Q. No.	Obj.	Questions	Answers
7	U	The force which causes entry of water into a cell is A) Turgor pressure B) Wall pressure C) Water potential D) None of these	C
8	U	During osmosis there is a flow of A) solute molecules B) solvent molecules C) both solute and solvent molecules D) electrons	B
9	A	Root pressure is measured by A) potometer B) manometer C) thermometer D) barometer	B
10	U	Water in plants is transported through A) cambium B) phloem C) xylem D) epidermis	C

Q. No.	Obj.	Questions	Answers
11	K	Dixon is associated with A) anaerobic respiration B) light reaction of photosynthesis C) cohesion theory of ascent of sap D) apical dominance	C
12	U	Potometer is used for measuring A) light intensity B) transpiration rate C) growth rate D) none of these	B
13	U	Wilting of plants results from excessive A) respiration B) photosynthesis C) absorption D) transpiration	D
14	U	Root pressure is maximum when A) transpiration is high and absorption is very low B) transpiration is very low and absorption is high C) tranpiration is very high and absorption is high D) transpiration and absorption are low	B

Q. No.	Obj.	Questions	Answers
15	U	Which of the following ions are involved in opening and closing of stomata ? A) Magneisum B) Iron C) Sodium D) Potassium	D
16	U	The process in leaf which may lower the temperature is A) respiration B) photosynthesis C) transpiration D) hydrolysis	C
18	K	Chloroplasts are present in the following epidermal cells A) Guard cells B) Epidermal cell C) Subsidiary cell D) None of these	A
19	U	Guttation is the process of elimination of water from plants through A) lenticels B) wounds C) stomata D) hydathodes	D

Q. No.	Obj.	Questions	Answers
FILL UP THE BLANKS			
1	U	Guard cells differ from epidermal cell in having _____.	chloroplasts
2	K	Dixon proposed the theory of _____ regarding ascent of sap.	transpiration cohesion tension
3	U	Connecting living systems between soil and atmosphere are _____	plants
4	U	In fruits and seeds _____ transpiration can be observed.	Lenticular
5	U	Main centres of transpiration are _____	Stomata
6	A	During night the sugars are converted into starch results into raising of the water potential. The stomata _____.	close
7	A	In plants normally stomata _____ during day time _____ during night.	open and closes
8	U	If guard cells are sunken in position, rate of transpiration is _____	reduced
9	A	When the atmosphere is unsaturated and dry, the rate of transpiration is _____	high
10	U	Pheny/mercuric acetate is _____	antitrans-pirant
11	A	In Bryophyllum plant stomata open during _____.	night
12	K	Gaseous exchange takes place between plants and atmosphere through _____.	diffusion
13	U	Cells that surround the stomata are _____.	guard cells

Q. No.	Obj.	Questions	Answers
14	U	The apparatus used to measure the rate of transpiration is _____.	Ganong's potometer
15	U	A high rate of transpiration occurs through _____.	stomata

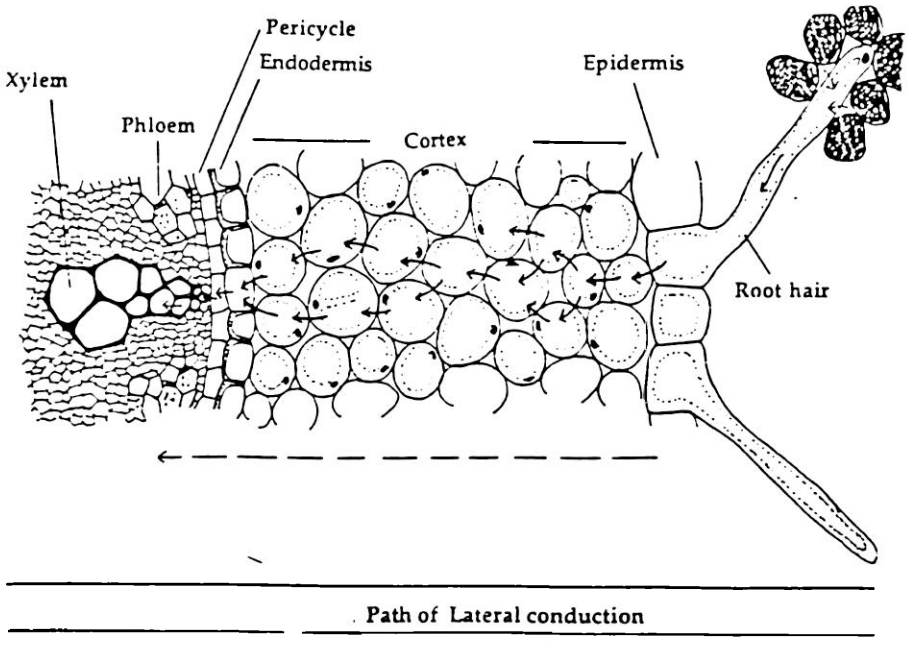
SHORT ANSWER QUESTIONS

1	K	Define transpiration ? Name the different types of transpiration ? Ans: The loss of water in vapour form through the aerial parts of plants is called tranpsiration. Types - (1) Stomatal transpiration: Through stomata of leaves. (2) Cuticular transpiration: Outer most waxy layer of epidermis. (3) Lenticular transpiration: Through lenticals.
2	U	Expain the following (a) Lenticels and (b) Hydathodes Ans: (a) Lenticels are found in the region of stomata and are loosely arranged complementary cells concerned with exchange of gas formed during secondary growth. (b) Hydathodes: Water secreting structures found along the margins of leaves (generally in humid places). Water escapes through them in the form of liquid. Surrounding cells are called epitheum.
3	A	Write a short account on significance of transpiration. Ans: Transpiration helps plants to dispose excess thermal energy by using it in the evaporation of water. It keeps the internal temperature of the plant cells uniform and constant. It has a role in the upward movement of water and also in absorption and translocation of mineral salts due to the pull and suction force it develops.

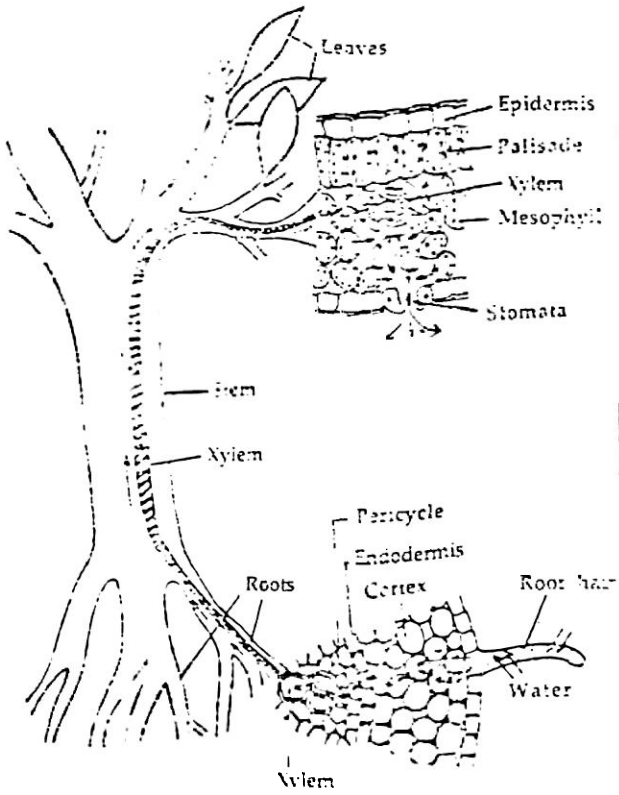
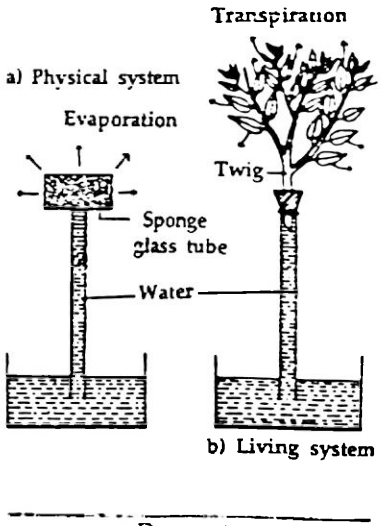
Q. No.	Obj.	Questions Answers
4	A	What is water potential ? Explain. Ans: The chemical free energy of water is called water potential. Free energy means amount of energy liberated from a substance when its potential energy is converted into kinetic energy. It is represented as The water potential of pure water is tkaen as 0 (zero) (maximum water potential). When we add solutes to water the negative value goes on increasing. Water flows from regions of less negative to regions of more negative water potential.
5	U	Explain the following (a) Turgor pressure, (b) Osmotic potential Ans: (a) Turgor pressure Due to entry of water into the cell a pressure develops within the cell. This hydrostatic pressure is called turgor pressure or may be defined as "positive hydrostatic pressure which develops within the cell due to osmotic entry of water". (b) Osmotic potential Pressure required to prevent the entry of solvent into a solution is called osmotic pressure. In modern approach, the term osmotic pressure is replaced by osmotic potential. "The potential required for the entry of solvent into a solution" is called osmotic potential.
6	A	"Water is essential for plant life". Discuss. Ans: The pimordial soup of ancient oceans from which life originated several billions of years ago on the earth had water as solvent. Therefore water is essential for life, its origin and also maintenance. - In cell 90-95% of the protoplasm is composed of water. - For the maintenance of physiological process in a plant cell. - Water as a universal solvent facilitates the absorption of minerals in the form of ions along with water. - Presence of water is an essential factor for enzyme activity. - Turgidity of the cell is maintained by water. - High specific heat of water enables the absorption of large quantity of heat energy with relatively less rise of temperature, very favourable for temperature maintenance in living systems.

Q. No.	Obj.	Questions	Answers
7	K	Define the following (a) Diffusion and (b) Imbibition Ans: (a) Diffusion phenomenon: "Movement of molecules of liquids, gases or solutes from the regions of higher concentration to regions of lower concentration until the molecules are evenly distributed throughout the available space" is known as diffusion. (b) Imbibition: Uptake of water by substances that do not dissolve in water, so that the process results in swelling of the substance.	
8	U	Explain plasmolysis. Ans: Shrinkage of protoplasm of a cell due to exosmosis is called plasmolysis cell is placed in higher concentrated solution. Water comes out of the cell and protoplast shrinks.	
VERY SHORT ANSWERS			
1	K	Name the phenomenon by which gaseous exchange takes places between plants and atmosphere ?	Diffusion
2	K	Name the phenomenon by which soil water enters the roots ?	Osmosis
3	U	What is the value of water potential of pure water ?	Zero
4	U	Which is the widely accepted theory for ascent of sap ?	Cohesion & tension theory
5	K	Expand SPAC	Soil Plant Atmosphere Continuum
6	U	Name the connecting living system between soil water and atmospheric water.	Plants

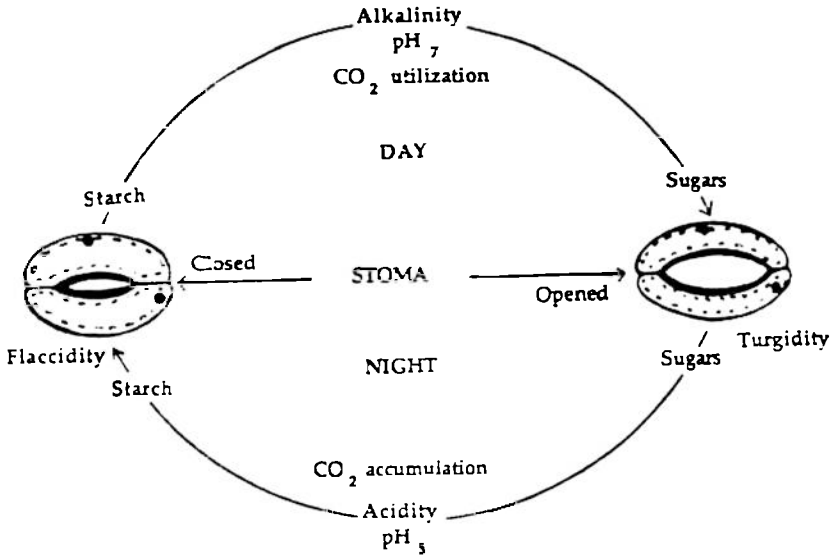
Q. No.	Obj.	Questions	Answers
7	U	In which plant stomata open during night time ?	Bryophyllum
8	U	Name the chemical which is used as an antitranspirant.	Phenyl mercuric acetate
9	U	The cell sap exerts pressure on the cell wall after the entry of water into the cell. What is that pressure called?	Turgor pressure
10	U	The value of osmotic potential of a cell is high. What would be the value of the water potential of that cell ?	Low
11	U	After a humid warm night, water drops appear along the margins of leaves of grasses. Name the phenomenon responsible for this ?	Guttation
12	U	Plants lose water in the form of water vapour during day time. Name the phenomenon responsible for this ?	Transpiration
13	U	Epidermal cells generally lack chloroplasts. But specialised epidermal cells show chloroplasts. Which are those ?	Guard cells
14	U	Why is the rate of transpiration high in Sorghum ?	Bec. of higher root-shoot ratio
15	U	How does the process of transpiration differ from guttation ? Ans: Transpiration - water is in the form of vapour Guttation - water in the form of drops	
16	A	When herbaceous plant is cut, sap exudes from the cut end. Name the force responsible for this exudation ?	Root pressure

Q. No.	Obj.	Questions	Answers
LONG ANSWER QUESTIONS			
1	K+A+S	Define osmosis. Describe an experiment to demonstrate osmosis.	Ans: Definition:"The movement of water from a solution of higher water potential to a solution of lower water potential across a differentially permeable membrane". Experiment: Thistle funnel, wide mouth is tied with egg membrane (or any semipermeable). The funnel is filled with 10% solution. Funnel placed in a beaker containing water, level of solution in funnel increases because the water potential is higher in pure water of beaker.
2	K	Describe the mechanism of lateral absorption of water by plants.	Ans: Water absorbing organ - roots - root hair mechanism - passive absorption - water potential in soil water high - cell salp of root hair - often water potential - inapoplast - diffusion - in symplast - osmosis process takes place - studies of root hair. Active absorption - no evidence - for help of metabolic energy.  Path of Lateral conduction

Q. No.	Obj.	Questions Answers
3	U+S	Explain the mechanism of ascent of sap in plants with the help of a suitable diagram. Ans: Ascent of sap - upward movement of water from root system to short system. Mechanism theories: (a) Vital theories, (b) Root pressure and (c) Physical force theories. Vital theories: Chief advocates Godlewski (1884), Jane (1887), Mac Dougal, J.C. Crose (1923) disproved because xylem vessels - tracheids - dead. Root pressure theory: Stephan Hales (1727)-development of positive hydrostatic pressure - due to accumulation of absorbed water - it is possible in only herbs and shrubs. Physical force theories: Widely accepted theory cohesion - tension - proposed by Dixon and Jolly (1894). Dixon (1914) theory based on adhesive and cohesive properties of water and transpiration pull. Water has high surface tension, high surface energy, water molecules adhere to the xylem vessels, water molecules adhered to each other, i.e. cohesive force high; therefore continuous water column is formed. Transpiration takes place in leaves, i.e. diffusion of water from leaf to atmosphere, because of water potential gradient that develops in mesophyll cells and xylem vessels. Negative pressure is at top of the plant, water flows from root to leaf. Experiment: Capillary tube is filled with water and placed in a beaker; wet sponge is placed at the upper end of cap. tube; apparatus below a ceiling fan. Here sponge is compared to leaf, cap tube is compared to xyl vessel, water in beaker is compared to water in rooted soil.

Q. No.	Obj.	Questions	Answers
		 Path of ascent of sap  Demonstration of Cohesion-tension theory	
4	U+S	Explain the mechanism of stomatal opening and closing with a suitable diagram. Ans: Structure of stomata - guard cells - bean shaped; thick wall towards aperture to guard cell - non-elastic, other side thin wall and elastic. Guard cells contain chloroplasts; absence of chloroplasts in subsidiary cells; dumbell shaped in monocots, opening and closing: turgidity and flacidity, day time - photosynthesis occurs in guard's cells, water potential decreases - water move from subsidiary cells to guard cells - TP develops and stoma opens - night time - glucose - converted to starch - $C_6H_{12}O_6$ ----> $C_6H_{10} + O_5 + H_2O$	

Q. No.	Obj.	Questions	Answers
		Due to this water potential increases, water moves from guard cell to subsidiary cell - decreases in guard cells - stomata closes.	
5	A	Another theory says, concentration of potassium ions promotes K^+ accumulates; therefore water potential decreases - water will flow from surrounding cells into guard cells and TP increases and guard cells open. Discuss the effect of various factors on the rate of transpiration. Ans: 1. Climatic factors (light, temperature, humidity of air, wind velocity, atmospheric pressure, internal factors: structure, occurrence and number of stomata, regulation of stomata (pH, concentration of CO_2). The guard cells regulates stomatal opening and closing. Anti-transpirants: Phenyl mercuric acetate causes partial closure of stomata.	



Schematic representation of closing and opening of stomata

TOPIC 2 : PHOTOSYNTHESIS

CONTENT POINTS:

1. Green plants synthesise carbohydrates by utilising water and CO_2 in the presence of sunlight.
2. It is an anabolic-synthetic process present in all green plants.
3. Entire oxygen of the atmosphere is derived from photosynthesis which is useful for respiration.
4. All organisms depend directly or indirectly on photosynthesis for their food.
5. It is a bio-chemical process converting light energy into chemical energy.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Calvin cycle takes place in A. ribosome B. mitochondria C. nucleus D. chloroplast	D
2	U	During photosynthesis A. glucose is produced during dark phase, and ATP during light phase. B. both glucose and ATP are produced during both light and dark phases. C. both glucose and ATP are produced during dark reaction. D. glucose is produced during light and ATP during dark reaction.	A
3	U	Photosynthesis deals with the reactions of A. catabolism B. metabolism C. anabolism D. none of the above	C

Q. No.	Obj.	Questions	Answers
4	U	In photosynthesis the light reaction is also called A. Kreb's cycle B. Calvin's cycle C. Photophosphorylation D. Blackmann's reaction	C
5	U	The process of photosynthesis takes place in A. the leaves B. the entire plant C. the cells of leaves D. the chloroplasts	D
6	U	By photophysynthesis, the plants prepare food materials this way A. By the use of H_2O and CO_2 B. By using CO_2 in presence of light C. By using CO_2 and H_2O in presence of light by chloroplasts D. By using CO_2 and H_2O with the help of chlorophyll	C
7	U	Chlorophyll is essential for A. protein synthesis B. fat metabolism C. respiration D. photosynthesis	D

Q. No.	Obj.	Questions	Answers
8	U	What is the first step in photo-synthesis ? A. Formation of ATP B. Ionisation of water C. Excitation of electron in chloroplast D. Carbon assimilation	C
9	U	The two types of photosynthetic pigments are A. chlorophyll-a and chlorophyllate B. chlorophyll-a and carotenoids C. chlorophyll-b and carotenoids D. chlorophylls and carotenoids	D
10	U	The first acceptor of CO_2 in C_2 plants is A. RuBp B. PGA C. OAA D. PEP	D
11	U	All green plants synthesise A. sugars only B. sugars and starch C. sugars, starch, fats D. sugars, starch, fats, proteins	D

Q. No.	Obj.	Questions	Answers
12	A	In photosynthesis the reaction take place are A. photochemical B. biochemical C. photobiochemical . D. none	C
13	U	The element present in the chlorophyll is A. iron B. sulphur C. magnesium D. calcium	C
14	A	The primary acceptor of CO_2 in C_3 plants is A. PGA B. RuBp C. PGA D. OAA	B
15	U	In non-cyclic photophosphorylation the electron is emitted by A. P.S. I_{700} B. P.S. II_{680} C. P.S. II_{700} D. P.S. I_{700} and P.S. II_{680}	D

Q. No.	Obj.	Questions	Answers
16	U	The transfer of energy in the form of ATP takes place in photosynthesis from A. dark reaction to light reaction B. light reaction to dark reaction C. chloroplast to mitochondria D. mitochondria to chloroplast	B
17	U	Very effective colour of light for photosynthesis is A. green light B. red light C. orange light D. blue light	B
18	K	The liberation of oxygen from water during photosynthesis was proved by A. Calvin B. Hill C. Arnon D. Blackmann	B
19	U	The assimilatory power produced in the light phase of photosynthesis is A. ATP B. $NADPH_2$ C. ATP and $NADPH_2$ D. None	C

Q. No.	Obj.	Questions	Answers
20	K	The dark reaction of photosynthesis takes place in A. stroma B. grana C. thylakoids D. ribosomes	A
21	U	Photo trapping chlorophyll is present A. in the grana of chloroplast B. in the stroma of chloroplast C. on the surface of chloroplast D. in the lumen of chloroplast	A
22	U	The efficient converter of radiation energy into chemical energy (food) is highest in A. wheat B. rice C. sugarcane D. jowar	C
23	K	The isotope used to study photo-synthesis is A. C^{15} B. C^{16} C. C^{14} D. C^{13}	C

Q. No.	Obj.	Questions	Answers
24	K	In C_4 plants CO_2 fixation occurs in the chloroplasts of A. Mesophyll B. Palisade tissue C. Spongy mesophyll D. Epidermal cells	C
25	K	The persons who received Nobel Prize for working in photosynthesis are A. Calvin and Watson B. Hatch and Slack C. Arnon and Fleming D. Calvin and Borlong	C
FILL IN THE BLANKS			
1	U	Phosphorylation is the process in which _____ is absorbed.	radiation energy
2	U	O_2 is liberated by splitting of _____ in the ions in photo-synthesis.	H_2O
3	U	During dark phase of photosynthesis _____ are fully utilised.	ATP and $NADPH_2$
4	K	During photosynthesis _____ gas is absorbed.	CO_2
5	K	Calvin has used _____ plant for tracing the path of carbon in photosynthesis.	Chlorella
6	K	_____ is considered to be aphotosynthetic apparatus.	Grana
7	K	_____ is the primary acceptor of CO_2 in C_3 plants.	RuBp

Q. No.	Obj.	Questions	Answers
8	K	A quantasome contains _____ chlorophyll molecules.	230 chl. molecule
9	A	Fixation of CO_2 takes place during night in _____ plants.	succulent xerophytes
10	A	If the intensity of light increases the rate of photosynthesis _____.	decreases
11	K	The sciophytes are considered _____ light plants.	short light
12	U	_____ elements are essential for photolysis of water.	Manganese & chlorine
13	A	If more carbohydrates are accumulated in chloroplasts it causes disorganisation of _____.	Thylakoids

VERY SHORT ANSWER QUESTIONS

1	K	Self producing plants are called Ans: Autotrophs
2	U	Which organisms convert the radiant energy into chemical energy ? Ans: Green plants
3	U	Name the pigment responsible for conversion of radiant energy into chemical energy. Ans: Chlorophyll
4	U	What is the source of energy for photosynthesis, which is stored in carbohydrates ? Ans: Sun - radiant energy
5	U	Name the food production centres of green plants. Ans: Chloroplasts
6	U	Name the autotrophs which do not depend on sun for energy, but utilise chemical energy for synthesis of food. Ans: (a) Chemo autotrophs, (b) Chemo synthetic bacteria, nitrogen, sulphur, (d) Hydrogen bacteria, (e) All

Q. No.	Obj.	Questions Answers
7	U	Which part of the electromagnetic spectrum is called light ? Ans:The part of light with 350 nm to 750 nm wavelength
8	U	In which for the radiant energy reaches the earth. Ans: Photons
9	K	What is a photon ? Ans:
10	K	What is a quantasome ? Ans: A structural unit in thylakoid to perform the light reactions.
11	A	Give the wavelength of the light reflected by a green leaf. Ans: 500-550 nm
12	A	What is the source of food for heterotrophs ? Ans: Autotrophs
13	U	Why the leaves containing chloroplasts appear in green colour ? Ans: Because they reflect green light of the absorbed light.
14	U	What colour of light reflected by isolated chlorophyll molecule ? Ans: Red light
15	U	What will happen if carotenoids are inactivated in green leaves ? Ans: Chlorophyll is photo oxidised.
16	A	Name the pigments which occur in tomato fruits. Ans: Carotenoidsd

Q. No.	Obj.	Questions Answers
17	U	Name the colour of light reflected by isolated chlorophyll molecule. Ans: Red light
18	A	Name the phenomenon involved in "emission" of red colour by pure isolated chlorophyll. Ans: Fluorescence
19	A	What type of chlorophyll is present in all autotrophic plants ? Ans: Chlorophyll-a-
20	A	Which of the photosynthetic pigments is bluish green in colour ? Ans: Chlorophyll-a
21	A	How much time does an excited electron take to come to its ground state ? Ans: 10^{-9} to 10^{-3} seconds
22	A	What is the colour of light reflected by chlorophyll-b ? Ans: Yellowish green
23	K	Name the scientists who classified the chlorophylls into nine types. Ans: Aronoff and Allen
24	U	Which pigment protects chlorophyll from photo-oxidation ? Ans: Carotenoids
25	K	Name the photo reaction centres found in the thylakoids. Ans: Quantasomes
26	K	What are considered as photosynthetic units ? Ans: Quantasomes

Q. No.	Obj.	Questions Answers
27	U	Name the method used to separate the photosynthetic pigments. Ans: Chromatography
28	U	In which part of the chloroplast does light reaction take place ? Ans: Thylakoids
29	U	Name the site of dark reaction in photosynthesis. Ans: Stroma of chloroplasts
30	A	Which is the primary acceptor of CO_2 amongst the organelles of a cell ? Ans: Chloroplast
31	U	What is photolysis of water ? Ans: Splitting of water into ions by light.
32	U	What is the first change that occurs in photochemical reactions of photosynthesis ? Ans: Photolysis of water
33	K	Who proved the source of oxygen is water ? Ans: Robert Hill
34	A	Oxygen released in photosynthesis comes from which substance ? Ans: Water
35	A	In photosynthesis which substance acts as electron donor ? Ans: Water
36	K	Who proved that the ATP and NADPH are the products of light phase ? Ans: Arnon

Q. No.	Obj.	Questions Answers
37	K	Name the substance of higher potential produced in the light phase. Ans: $NADPH_2$
38	K	Name the scientists who proved that the photosynthetic efficiency increases under short periods of light. Ans: Emerson, Arnold
39	A	What will happen if the products of light phase (ATP and $NADPH_2$) are not used up immediately ? Ans: The rate of photosynthesis decreases
40	K	Who used isotope of oxygen (^{18}O) to prove water as a source of oxygen ? Ans: Ruben, Kamen
41	K	Which elements are essential for photolysis of water ? Ans: Manganese, chlorine
42	K	Name the scientist who proposed the photosynthetic mechanism in some bacteria. Ans: Von Neil
43	U	What is the source of hydrogen to reduce CO_2 to CH_2O ? Ans: Water
44	K	Name the scientist who used C^{14} isotope to reveal CO_2 reduction. Ans: Melvin Calvin
45	U	What is assimilatory power ? Ans: The molecules of ATP and NADPH required for reduction of CO_2 to CH_2O.
46	U	Which is the pigment system-I to eject the electrons from outer orbit ? Ans: P-680

Q. No.	Obj.	Questions Answers
47	U	Which organisms do not liberate O_2 in photosynthesis ? Ans: Photosynthetic bacteria, Chlorobium, Rhodospirillum
48	U	Which autotrophs live in dark than in light ? Ans: Chemoautotrophs
49	A	Why C_3 cycle is called as a Calvin cycle of carbon assimilation ? Ans: The products of carboxylation contain C_3 carbon atoms coined by Melvin Calvin.
50	U	What are the oxidants involved in Hill reaction ? Ans: Ferredoxin, quinone, ferric salts, 2,6 dichloro-indophenol.
51	A	Which substance is formed in the dark phase of C_3 plants ? Ans: PGAL or GAP
52	U	What is the final product of carbon assimilation ? Ans: GAP
53	A	How much assimilatory power is used for reducing one molecule of CO_2 ? Ans: 3 ATP and 2 NADPH
54	A	For reduction of 6 CO_2 how many ATP and NADPH molecules are used up ? Ans: 18 ATP and 12 NADPH
55	U+S	Write equation representing total mechanism of photosynthesis. Ans: $6\ CO_2 + 12\ H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6H_2O + 6O_2$
56	U+S	Represent the equation of the entire C_3 cycle. Ans: $12H_2O + 6CO_2 + 6RuBp + 18\ ATP + 12\ NADPH_2 \longrightarrow C_6H_{12}O_6 + 18ADP + 12NADP + 6H_2O + 6RuBp$

Q. No.	Obj.	Questions Answers
57	A	What will happen if the concentration of O_2 is increased around a C_3 plant ? Ans: Photorespiration takes place
58	K	What is the hypothesis proposed by Bayer for CO_2 reduction ? Ans: Formaldehyde hypothesis
59	U	What are the steps in CO_2 fixation in plants ? Ans: Carboxylation, reduction, regeneration of CO_2 acceptor.
60	U	What is the primary acceptor of CO_2 in photosynthesis? Ans: RuBp
61	A	What will happen if the concentration of CO_2 is increased by ten times around a green plant ? Ans: It increases rate of photosynthesis.
62	A	Which plant lives longer if a C_3 and a C_4 plants are placed in an air tight tell jar with full illumination ? Ans: C_4 plant lives longer.
63	A	What are the reasons for higher photosynthetic efficiency of C_4 plants ? Ans: Absence of photorespiration, two methods of carbon fixation.
64	K	What is the first stable product of photosynthesis in C_3 plants ? Ans: PGA
65	K	Name the first and final product of carbon assimilation in C_3 plants. Ans: Glyceraldehyde phosphate

Q. No.	Obj.	Questions Answers
66	A	Name the substances of 4, 5, 6, 7 carbon atoms which are formed in Calvin cycle. Ans: 4-erythrose, 5-xylulose, ribose, ribulose, 6-glucose, fructose, 7-sedoheptulose
67	A	In which plants carbon fixation takes place during nights ? Ans: Bryophyllum, Kalenchoe
68	A	Name the plants in which carbon fixation takes place and hexose sugar synthesis occurs in the same cell, but at different times. Ans: CAM plants
69	U	Which are the three cell organelles involved in photorespiration ? Ans: Chloroplast, peroxisome, mitochondrion
70	U	Where does actual oxidation occur in photorespiration? Ans: In peroxisomes
71	U	In photorespiration where does CO_2 liberation take place ? Ans: In Mitochondria
72	A	Which succulent plant accumulates organic aids during night ? Ans: Bryophyllum
73	A	Where does Calvin cycle occur in the leaves of C_3 plants ? Ans: In mesophyll cells
74	A	Which is the acceptor of CO_2 in carbon fixation of C_4 plants ? Ans: Phospho enol pyruvate
75	U	What is compensation point in photosynthesis ? Ans: When rate of respiration equalises with the rate of photosynthesis.

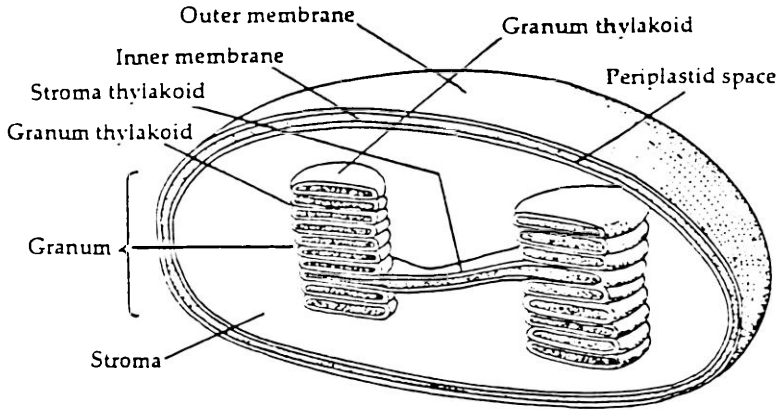
Q. No.	Obj.	Questions	Answers
76	U	What is solarisation ?	
			Ans: When chlorophyll is destroyed by photo oxidation at very high light intensity.
77	A	What is the percentage of water utilised in photo-synthesis out of the total water absorbed ?	
			Ans: Less than 1 per cent.
78	K	What are limiting factors and who proposed the law of limiting factors ?	
			Ans: CO_2 and light; Blackman
79	K	What is Wanburg effect ?	
			Ans: Decrease in rate of photosynthesis due to high concentration of oxygen.
80	A	What is the first product in C_4 plants and CAM plants, after carboxylation ?	
			Ans: Oxaloacetic acid
81	A	What is the four carbon intermediate compound of Calvin cycle ?	
			Ans: Erythrose phosphate
82	U	Give two examples of C_4 plants belong to Poaceae.	
			Ans: Sorghum, maize
83	A	Which plants show beta-carboxylation ?	
			Ans: Sugarcane, Bryophyllum
84	U	What is the optimum temperature of photosynthesis in tropical plants ?	
			Ans: $35^{o}C$ to $40^{o}C$
85	A	What is the role played by water in photosynthesis ?	
			Ans: Water splits into ions to act as donor.

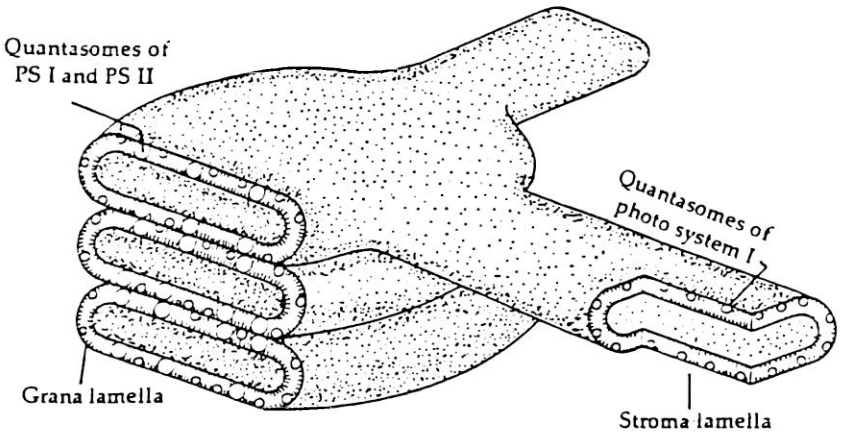
Q. No.	Obj.	Questions Answers
86	U	Which substance with higher potential is formed in the light phase ? Ans: $NADPH_2$
87	U	What techniques were employed by Melvin Calvin to trace out the carbon reductdion pathway ? Ans: Chromatography and Autoradiography
88	K	What is Redox potential ? Ans: It is a tendency of an atom or molecule to give or take up electrons.
89	U	What is phosphorylation and photophosphorylation ? Ans: Synthesis of ATP from ADP and inorganic phosphate (Pi) is known as phosphorylation. Formation of ATP in the chloroplast by utilising light energy is known as photophosphorylation.
90	U	What is absorption spectrum ? Ans: Absorption of light by pigments at different wavelengths.
91	A	Which photo system is associated with ionisation of water ? Ans: Photosystem-II
92	K	Name the metal associated with plastocyanin. Ans: Copper atoms - Cu
93	A	What is the alternative term for the matrix of the chloroplast ? Ans: Periplastid
94	S	What is the molecular formula of chlorophyll-a ? Ans: $C_{55}\ H_{72}\ O_5\ N_4\ Mg$
95	U	What are the types of ribosomes found in chloroplast ? Ans: 50S and 30S ribosomes

Q. No.	Obj.	Questions	Answers
96	U	What is P_{700} ?	
		Ans: Chlorophyll with effective absorption of light at 700 nm.	
97	U	Name the 4C sugar of Calvin cycle.	
		Ans: Erythrose	
98	K	Who proved the necessity of light for photosynthesis ?	
		Ans: Jan Ingenhousz	
99	K+S	Write the formula of end product of photosynthesis.	
		Ans: $C_6H_{12}O_6$ (Glucose)	
SHORT ANSWER QUESTIONS			
1	U	Write briefly a note on photoionisation of water or photolysis of water.	
		Ans: Splitting of water into ions by chloroplasts in the presence of hydrogen acceptor and light is called photolysis or photoionisation of water, proposed by Robin Hill. Ferric compounds, quinone, dichloroendo-phenol were the acceptors of hydrogen called Hill oxidants O_2 is evolved and NADP converts into $NADPH_2$.	
2	U	Write any three differences between light and dark reactions of photosynthesis.	
		Ans: a) Light reaction requires light or radiation energy to synthesise chemical energy. Dark reaction do not require the light except the products of light reaction.	
		b) Light reactions take place in Thylakoids and dark reactions in stroma of chloroplasts.	
		c) Photolysis takes place in light, but in dark carboxylation takes place.	
3	A	What is an assimilatory power ? How is it produced in a leaf cell ?	
		Ans: In light phase ATP, $NADPH_2$, O_2 are formed. Only ATP, $NADPH_2$ are utilised in dark phase for CO_2 fixation and are called assimilatory power. Leaf contains green pigments (chloroplasts0 which absorb light energy to reduce ADP into ATP and NADP into $NADPH_2$ in cyclic or non-cyclic forms of photo-phosphorylation.	

Q. No.	Obj.	Questions Answers
4	U	How photosynthesis differs from respiration ? Ans: Photosynthesis reactions are anaerobic in nature, whereas the reactions in respiration are catabolic. Photosynthesis carries reactions of photochemical nature in the chloroplast.In respiration the reactions are of a bio-chemical nature and are carried only in mitochondria.
5	U	What is CAM ? Write ecological significance. Ans: CAM is called Crassulacean Acid Metabolic pathway, since in some plants of Crassulaceae family (Bryophyllum, Opuntia, Cactus, etc.) fixation of CO_2 is carried on in the plants during night only.
6	U	Mention any two differences between quantasomes of photosystems I and II. Ans: Photosystem-I absorbs red light of longer wavelength in chlorophyll-a called P_{700}. It is called red photosystem. Photosystem-II is mostly composed of chlorophyll-b. It absorbs red light of shorter wavelength. It evolves O_2. The reaction centre is called P_{680} present in PS II.
7	U	What is cyclic photophosphorylation ? Ans: In cyclic photophosphorylation the pigment system I precipitates (P_{700}). The excited energetic electrons liberated from chlorophyll molecule return back to the same chlorophyll after losing the energy to form energy rich ATP from ADP.
8	U	Explain how a chloroplast is a semi-autonomous organelle. Ans: Since the chloroplast has ribosomes and DNA it is called a semi-autonomous organelle since it can synthesise some of its required proteins.
9	A	Explain how a plant placed in air free of oxygen would live longer in light than in dark. Ans: A plant placed in air free of oxygen in light would live longer because of CO_2 available with which it can produce the food. Whereas the same plant it placed in dark cannot synthesise the food, so it dies.

Q. No.	Obj.	Questions	Answers
10	K	Given an account of the ultra structure of chloroplast.	Ans: The chloroplast ranges 4-6 u in length and 1-3 u in thickness. It is covered by an envelope of two membranes. The matrix inside is stroma, in which it contains lamellae, starch grain, 70s ribosomes, RNA and a little DNA. Lamellae are arranged in stocks called grana (Thylakoids). The membranes of Thylakoids are composed of proteins, phospholipids, pigments (chlorophylls and carotenoids and phycobilins). Light reactions are carried at quantasomes in grana, and dark reactions are carried in stroma.





Model of the structure of Granum thylakoid and stroma thylakoid showing the distribution of PS I and PS II

Q. No.	Obj.	Questions	Answers
11	K	What is non-cyclic electron transport in photophosphorylation ?	Ans: Photosystems I and II take part in non-cyclic photophosphorylation, in which electrons liberated from chlorophyll do not return to the same chlorophyll. PS I absorbs protons and liberates energised electrons, which pass through reducing substances (Ferredoxin) finally reaching NADP reducing to $NADPH_2$ and 1/2 O_2 is formed due to hydrolysis of water into ions. PS II (P_{680}) absorbs light and liberates energy rich electrons, which pass through quinone, plastoquinone, cyt.b_6 and cyt-7, plastocyanin and finally reduce PS I. During this ATP is synthesised in between cyt. b_6 and cyt. f.
12	A	What changes take place if all photosynthesisers are destroyed on earth ?	Ans: The photosynthesisers on earth are green plants which convert radiant energy into chemical energy and store in the form of food which is used by all living organisms directly or indirectly. Plants being the source of food can also liberate O_2 which is essential for respiration to all organisms. If photosynthesisers are removed no any organisms survive on earth.
13	U	What is the importance of light in photosynthesis ?	Ans: All autotrophs synthesise the carbohydrates in chloroplasts, which depend totally on light for photochemical reactions at first stage. Finally the assimilatory power produced in the light phase is used in carbon fixation and carbohydrates are produced in the dark phase.
14	K	What is carboxylation ?	Ans: Carboxylation is the dark phase of photosynthesis in which CO_2 fixation takes place. CO_2 is accepted by a 5 carbon compound called RuDp in C_3 plants. If 6 molecules of RuDp accept $6CO_2$, six molecules of unstable hexose is formed, which immediately converted into 12 molecules of 3 carbon compound (PGA). First stable product is 3 carbon compound. Hence it is called C_3 cycle and plants are called C_3 plants.

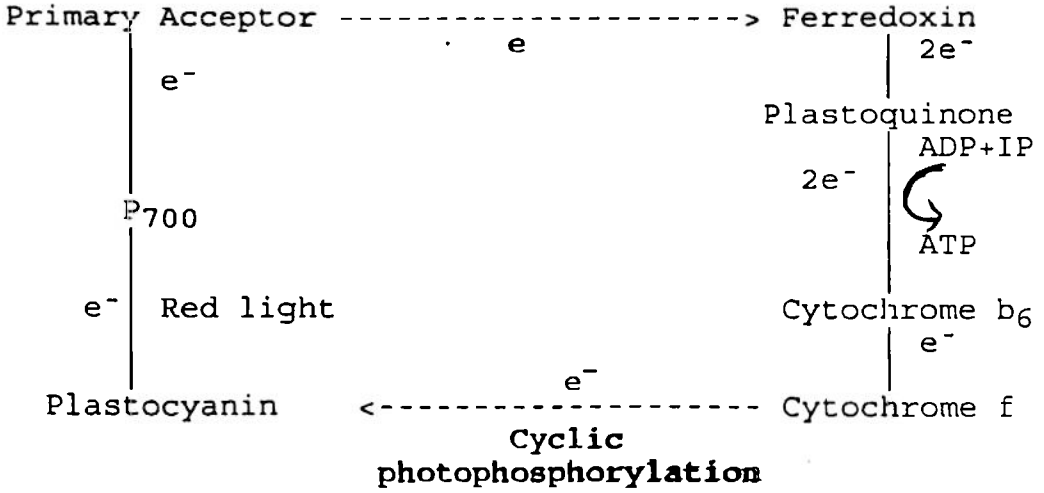
Q. No.	Obj.	Questions Answers
15	U	Explain the effect of light and temperature on photosynthesis. Ans: Light intensity, quality and duration influence the rate of photosynthesis. If intensity increases the rate of photosynthesis decreases since the chlorophyll is destroyed by photooxidation. Photosynthesis requires only the visible range in between 390 nm to 760 nm. Temperature has maximum influence on dark phase of photosynthesis, it is called as thermochemical reaction. The minimum, optimum and maximum ranges of temperature depend on the type of plant and geographical distribution.
16	A	Explain why light is not required in dark phase. Ans: The dark reactions of photosynthesis occur in the stroma of the chloroplast. These reactions do not require light. However they can take place during day time also. During the dark reactions CO_2 is assimilated to form sugars utilising the assimilatory power generated during light phase of photosynthesis, but light is not needed for reduction of CO_2.
17	U	What is CAM mechanism ? Ans: CAM pathway
18	U	Distinguish between phosphorylation and photophosphorylation. Ans: Synthesis of ATP from ADP and inorganic phosphate (IP) is called phosphorylation. Synthesis of ATP in the chloroplast by utilising light energy is called photophosphorylation
19	U	Write the differences between C_4 plants and C_3 plants. Ans: The primary acceptor of CO_2 in C_4 plants is phospho enol pyruvate (PEP), which produces oxalo acetic acid (OAA) as the first stable product. OAA is a four carbon compound and a dicarboxylic acid. This is called beta-carboxylation. Hence these plants are called C_4 plants. In C_3 plants the primary acceptor of CO_2 is 5-carbon compound called BuBp. In this first stable compound formed during photosynthesis is phosphoglyceric acid (PGA) a 3 carbon compound. It is called C_3 cycle and the plants are C_4 cycle.

Q. No.	Obj.	Questions Answers
20	U	Explain the effect of external factors on the rate of photosynthesis. Ans: The external factors are 1. light 2. temperature 3. carbondioxide 4. water 5. oxygen concentration 6. mineral elements
21	U	How do radioactive isotopes help us in understanding the mechanism of photosynthesis ? Ans: The different sequential reactions are involved in dark phase of photosynthesis. The carbon reduction pathway was traced in Chlorella and Scenedesmus by Melvin Calvin and his associates by using radioactive isotope of carbon (^{14}C). They used techniques like chromatography and autoradiography in these experiments. Melvin Calvin was awarded Nobel Prize in 1961 for this work of photosynthesis of CO_2 fixation.
22	U	What is photorespiration ? Explain. Ans: In C_3 plants considerable fraction of photosynthetically fixed carbon is immediately degraded releasing CO_2 in an oxygen consuming reaction. This process occurs only in the light. It has been called photorespiration.
23	U	What is a limiting factor ? Explain the law of limiting factors. Ans: When a physiological process is conditioned or controlled or influenced by a number of factors, the rate of physiological process is determined by the rate or availability of the slowest factor is called the "law of limiting factors". For example on a cloudy day or during raining the limiting environmental factor for photosynthesis will be light intensity. At this moment of time the rate of photosynthesis can be increased in the plant only by increasing the intensity of light.

Q. No.	Obj.	Questions	Answers
24	U	Explain how photosynthesis is much concerned with fixation of carbon than release of oxygen.	Ans: The photosynthesis is carried on in two phases, the light phase and the dark phase. In light phase the production of only assimilatory power such as ATP and $NADPH_2$ takes place with release of O_2, but CO_2 is not utilised. In the case of dark phase CO_2 fixation takes place, which leads to the formation of hexase sugar. That is the ultimate and final product of photo-synthesis at the end of the process.

LONG ANSWER QUESTIONS

1	U+S+A	What is photophosphorylation ? Describe cyclic and non-cyclic light reactions with the help of diagramatic representation.	Ans: "The process of formation of ATP from ADP and inorganic phosphate (IP) utilising the energy carried by emitted electron in its transportation in the light phase of photosynthesis is called photophosphorylation". Arnon (1954) recognised two types, cyclic and non-cyclic types. I. Cyclic Electron Transport It involves the pigment system I with P_{700} nm. It absorbs a photon of light and emits energy rich electron. It is carried by several electron carrier molecules. The primary acceptor of electron iron-sulphurr protein called Ferredoxin. The electron passes through plastoquinone Cyt. b_6 and cyt. f, plastocyanin and returns to the PS I to its normal state. One ADP is photophosphorylated to form ATP in between plastoquinone and cytochrome b_6.



Q. No.	Obj.	Questions	Answers

II. Non-Cyclic Electron Transport

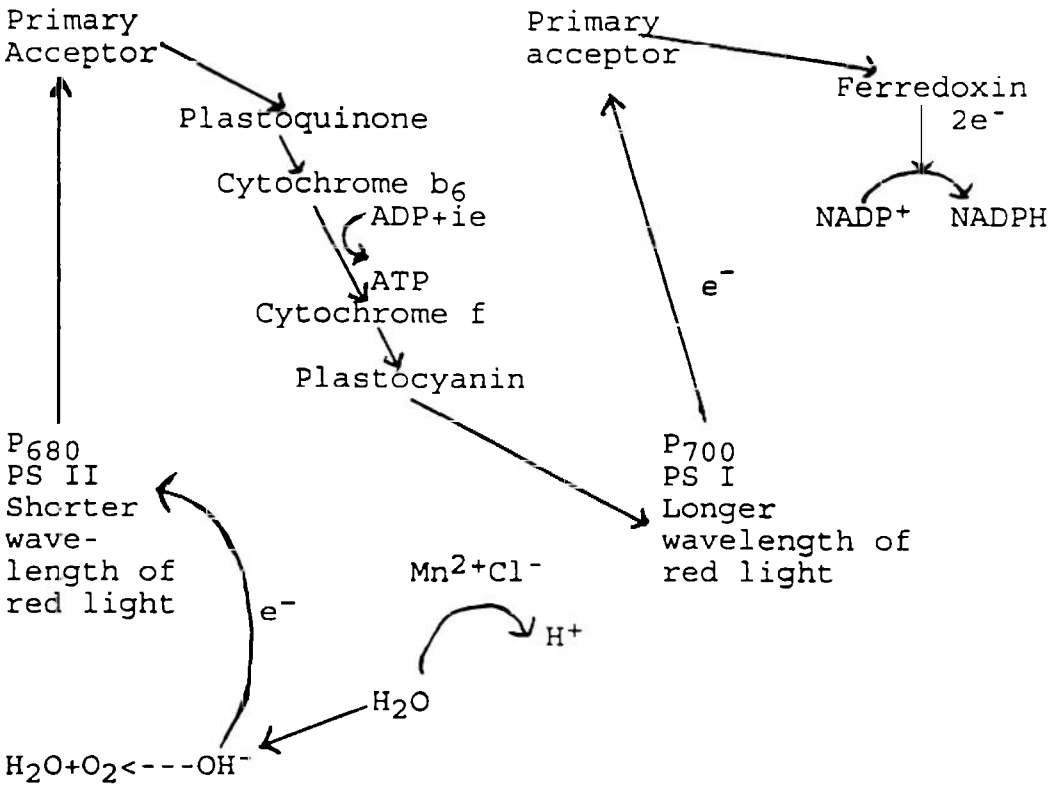
In this generation of ATP accompanied with production of NADPH and O_2 takes place. It is efficient system to trap light energy and converting into chemical energy. It occurs in higher plants, and involves photosystem I and PS II (P_{680}).

PS I_{700} is activated by red light of longer wavelength, releases energy rich electron which is accepted by Ferredoxin reducing substance FRS. Electrons are transferred to Ferrredoxin which reduces $NADP^+$ to NADPH by providing two electrons.

PS II P_{680} is activated by red light of shorter wavelength and releases energy rich electrons, which are accepted by pheophytin a primary acceptor. From pheophytin electrons are passed to quinone and to plastoquinone to cyt. b_6 and then to cyt. f and then to plastocyanin and finally to excited P_{700} PS I to bring it to ground state.

In between cyt. b_6 to cyt. f one ADP is photophosphorylised to ATP utilising the energy from transporting electron.

Photosystem II splits H_2O into H^+ and OH^- ions. H^+ ions are passed to the thylakoid channel for supply of protons. OH^- ions rewrite to release O_2 and electrons. This electrons are transferred to PS II which comes to ground state.

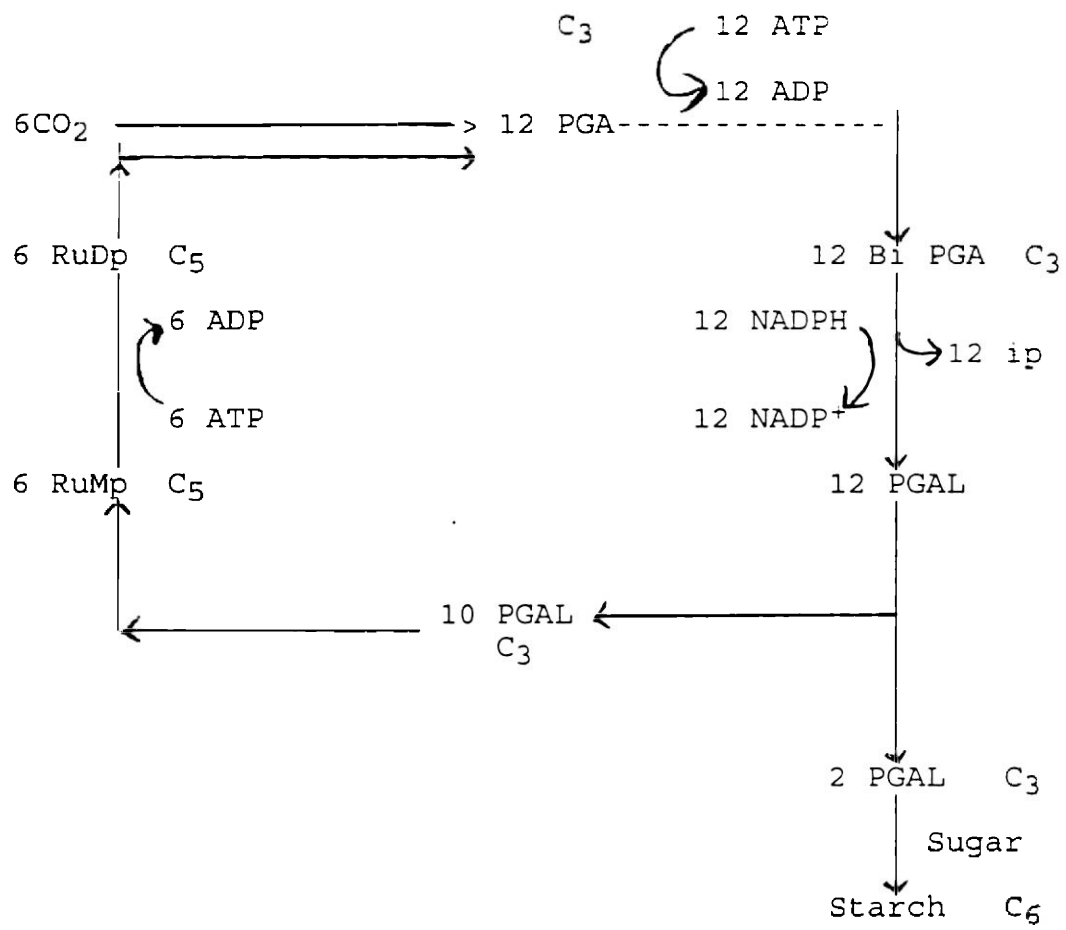


NON-CYCLIC PHOTOPHOSPHORYLATION

Q. No.	Obj.	Questions Answers
2	U+S	Explain the process of conversion of light energy into chemical energy by green plants or explain the carbon fixation or assimilation of carbon in C_3 plants or explain the Calvin cycle with diagramatic representation Ans: The fixation of CO_2 is represented in Calvin cycle in dark phase of photosynthetic reactions, includes three step - 1. carboxylation, 2. reductive phase, 3. regeneration phase. **I. Phase - Carboxylation** CO_2 is accepted by a 5C compound called RuBp in C_3 plants. Six molecules of RuBp accept $6CO_2$ and 6 unstable hexoses are formed which are immediately converted into 12 molecules of PGA. **II. Phase - Reductive phase** In this phase PGA is reduced to PGAL bvy NADPH in presence of ATP. Kinase 1. 6PGA + 6ATP --------> Bis PGA Dehydrogenase 2. 6 Bis PGA + 6 NADPH ----------> 6PGAL + 6ip Isomerase 3. 3PGAL ----------> 3DHAP Aldolase 4. 2DHAP + PGAL ----------> 1 1/2 fructose biphosphate Phosphatase 5. Fruct. Biphos. ----------> Fruct. mono phos Polymerase 6. Fruct. mono. phos. ----------> Starch **III. Phase - Regeneration phase** The primary CO_2 acceptor RuBp is regenerated through three pathways.

Q. No.	Obj.	Questions Answers
		1st pathway 1. Fruct. mono. phos. (6C) + PGAL (3C) ----> Xylulose monophos. (5C) + Erythrose mono phos (UC) Epimerase 2. Xyl. mono phos. ----------> Rribulose mono phos Kinase 3. Ribulose mono phos + ATP --------> RuBp + ADP **2nd pathway** 1. Erythrose monophos (UC) + DHAP (3C) -----> Sedoheptulose Biphos (7C) Phosphatase 2. Sed. Biphos. ----------> Sed. mono phos + ip 3. Sed. monophos (7C) + PGAL (3C) -----> Xylulose monophos (5C) + Ribulose monophos (5C) Epi merase 4. Xylulose monophos(5C) ------> Ribulose monophos(5C) Kinase 5. Ribulose monophos + ATP --------> RuDP (5C) + ADP **3rd pathway** Isomerase 1. Ribose monophos ----------> Ribulos monophos Kinase 2. Ribulose monophos + ATP --------> RuDp + ADP **The overall Calvin Benson cycle is** $6RuDp + 6CO_2 + 18ATP + 12H_2O + 12NADPH$ ---->$6RuDp + Glucose + 18ADP + 18TP + 12NADP$

Q. No.	Obj.	Questions	Answers



CALVIN BENSON CYCLE

TOPIC 3 : RESPIRATION

CONTENT POINTS:

Respiration is a metabolic process that takes place in all living cells. It may be defined as the oxidation of organic substrates and liberation of carbondioxide and energy.

Q. No.	Obj.	Questions	Answers
		MULTIPLE CHOICE QUESTIONS	
1	U	Respiration as a catabolic process results in A. increase in dry weight B. no change in weight C. decrease in dry weight D. increase in the accumulation of starch	C
2	U	Which is the end product of fermentation ? A. Starch B. Pyruvic acid C. Ethyl alcohol D. Acetyl CoA	C
3	U	Enzymes in respiration which are connected with the release of electrons are A. Oxidases B. Carboxylases C. Dehydrogenases D. Fumerases	C
4	U	Pyruvic acid is formed in A. glycolysis B. Krebs cycle C. electron transport system D. photophosphrylation	A

Q. No.	Obj.	Questions	Answers
5	U	The initiation of citric acid cycle is with A. Malic acid B. Acetyl CoA C. Succinic acid D. Fumaric acid	B
6	U	When a molecule of hexose sugar is subjected to glycolysis, the number of net ATPs gained is A. 2 B. 4 C. 8 D. 6	A
7	U	Enzymes useful for liberation of CO_2 molecules during respiration are A. Isomerases B. Dehydrogenases C. Decarboxylases D. Enrolase	C
8	U	The substrate that undergoes primary biological oxidation in glycolysis is A. Fructose-1,6-biphosphate B. Phosphoglyceric acid C. Dihydroxy acetone phosphate D. Glyceraldehyde-3-phosphate	D

Q. No.	Obj.	Questions	Answers
9	K	The energy released during respiration is A. lost as heat B. stored in ATP C. utilised in photosynthesis	
10	U	In Krebs cycle, NAD is reduced during the conversion of A. Male to OAA B. Succinic acid to Fumaric acid C. Citric acid to cis aconitic acid D. Succinyl CoA to succinic acid	A
11	U	The energy liberated by cellular respiration forms ATP by A. Glycolysis B. Calvin cycle C. Krebs cycle D. Oxidative phosphorylation	D
12	U	Oxidation of pyruvic acid would yield A. Acetyl CoA + $NADH_2$ + CO_2 B. $NADH_2$ + CO_2 + ATP C. Acetyl CoA + CO_2 + $FADH_2$ D. $NADH_2$ + CO_2 + Water	A
13	U	Flavoproteins and cytochromes involved in respiration are arranged in A. thylakoid of chloroplast B. ribosomes C. cytoplasm D. the inner mitochondrial membrane	D

Q. No.	Obj.	Questions	Answers
14	K	The common phase between aerobic and anaerobic respiration is called A. TCA cycle B. Oxidative phosphorylation C. Glycolysis D. Krebs cycle	C
15	A	The energy present in ATP molecules is released by A. Photolysis B. Hydrolysis C. Phosphorylation D. Reduction	B
16	U	Which of the following is the primary substrate for respiration ? A. Starch B. ATP C. ADP D. CO_2 and water	A
17	A	The net gain of energy from one mole of glucose during aerobic respiration is A. 10 ATP B. 24 ATP C. 40 ATP D. 38 ATP	D

Q. No.	Obj.	Questions	Answers
18	U	The reactions of Krebs cycle take place in the A. cytoplasm B. nucleus C. surface of mitochondria D. matrix of mitochondria	C
19	U	In respiration, if the value of RQ is OT the respiratory substrate is a A. carbohydrate B. protein C. amino acid D. fat	D
20	A	The process of respiration plants specially in young active cells the rate is A. more B. less C. more rapid D. more rapid than older cells	D
FILL IN THE BLANKS			
1	U	During ATP synthesis_____ and_____ are passing through the cytochromes and flavoproteins.	electrons and protons
2	K	_____ is the common immediate source of energy in cellular activity.	ATP
3	K	A metabolic process necessarily shown by all living cells is_____.	respiration
4	K	Pyruvic acid enters Krebs cycle in the form of_____.	acetyl CoA

Q. No.	Obj.	Questions	Answers
5	K	_____ is a metabolic activity in which macromolecules are breaking down into simple precursors.	Catabolism
6	K	The nitrogenous base found in ATP molecule is_____.	Adenine
7	U	Glycolysis is performed by the enzymes present in the_____ of cells.	cytoplasm
8	K	Glycolysis is also called_____.	EMP pathway
9	U	The substance that is ultimately reduced during respiration is_____.	oxygen
10	U	Injury to plant organs results in an initial_____ in the rate of respiration.	increase
11	A	Ganong's respiroscope experiment is to demonstrate that during respiration _____ is liberated.	CO_2
12	K	_____ are called 'power houses' of cells.	Mitochondria
13	A	Boiled enzymes fail to ferment sugar because of_____.	denaturation
14	U	The initial product of TCA cycle is _____.	citric acid
15	U	_____ is the 5C compound formed during Krebs cycle.	-ketoglutaric acid

MATCH THE FOLLOWING

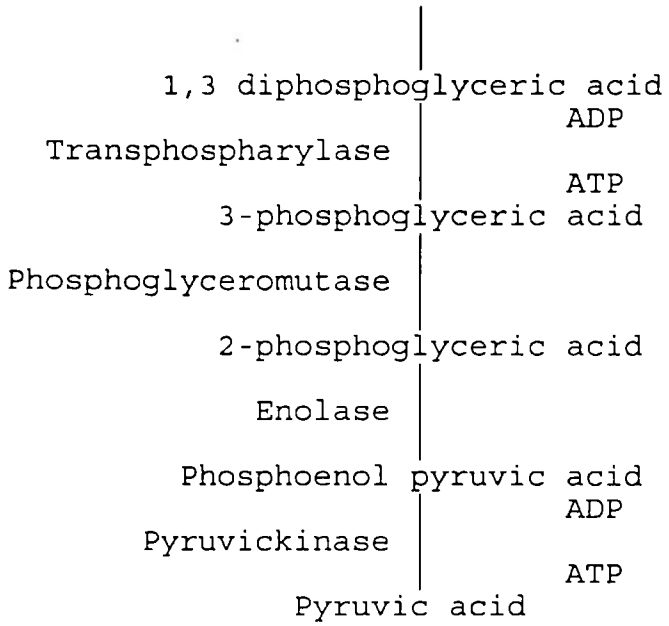
	A	B	
U	1. $FADH_2$	a. Yeast	1-c
K	2. Glycolysis	b. Carbohydrate	2-e
K	3. Fermentation	c. 2 ATP molecules	3-a
K	4. RQ value	d. Co-enzyme	4-b
K	5. FAD^+	e. Sweet splitting	5-d

Q. No.	Obj.	Questions	Answers
SHORT ANSWER QUESTIONS			
1	K	Define respiration. Mention the two types of respiration.	Ans: An oxidative process in which chemically bound form of complex organic fuel molecules such as carbohydrates, proteins and fats is captured in the form of ATP. 1. Aerobic respiration 2. Anaerobic respiration
2	U	What are the preparatory reactions of the Krebs cycle ?	Ans: 1. Glygolysis 2. Oxidation of pyruvic acid
3	U	What is EMP pathway ?	Ans: The glycolysis is also known as EMP pathway. The reactions of glycolysis were first described by Embden, Meyerhoff and Parnas and hence it is called so.
4	U	Differentiate alcoholic fermentation from lactic acid fermentation.	Ans: 1. Pyruvic acid is broken down to ethyl alcohol and CO_2 during lactic acid fermentation pyruvic acid is broken down into lactic acid. $C_6H_{12}O_6 \xrightarrow[\text{Fermentation}]{\text{Ethyl alcohol}} 2C_2H_5OH + 2CO_2 + 2ATP$ $C_6H_{12}O_6 \xrightarrow[\text{Fermentation}]{\text{Lactic acid}} 2C_3H_6O_3 + ATP$
5	U	What is anaerobic respiration ?	Ans: Partial oxidation of glucose without utilising O_2 is called anaerobic respiration. $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2 + 56$ KCal

Q. No.	Obj.	Questions	Answers
VERY SHORT ANSWERS			
1	U	What will happen if oxygen is supplied to a plant which is respiring anaerobically ?	Ans: It begins to respire aerobically (ATP) synthesis increases
2	U	Name the type of respiration in which energy present in the food substances is completely released.	Ans: Anaerobic respiration.
3	K	Name the metabolic process in which the energy present in the food materials is released in a stepwise manner.	Ans: Respiration
4	K	Which are the main enzymes involved in the biological oxidation of food materials ?	Ans: Oxidoreductases
5	K	Where does glucolysis occur in a cell ?	Ans: In the cytoplasm
6	K	Name the process by which glucose molecule is activated before undergoing oxidation.	Ans: Phosphorylation
7	U	Give the oxidative decarboxylation reaction of Krebs cycle.	Ans: A. Pyruvic acid + CoA --> Acetyl CoA + CO_2 | B. -ketoglutaric acid+CoA --> Succinyl CoA+CO_2
8	U	Rearrange the following Krebs cycle intermediaries in the correct order of their formation. Succinic acid, oxaloacetic acid, succinyl CoA, citric acid, -keto-glutaric acid, fumaric acid.	Ans: |---------- Citric acid ----------| Oxaloacetic acid -ketoglutaric acid | | Fumaric acid succinyl CoA | | |---------- Succinic acid ----------|

Q. No.	Obj.	Questions Answers
9	K	Name the process by which ATP is synthesised during respiration ? Ans: Oxidative phosphorylation
LONG ANSWERS		
1	U	Compare respiration and photosynthesis ? Ans: a. Respiration occurs in all living cells but photosynthesis occurs in cells with chloroplast and chlorophyll. b. Respiration is a catabolic process whereas photo-synthesis is an anabolic process. c. Respiration occurs both in light and darkness continuously but photosynthesis occurs only in light. d. End products of respiration are CO_2 and H_2O, but starch and O_2 are the end products of photosynthesis. e. ATP is produced by oxidative phosphoxylation during respiration but during photosynthesis ATP molecules are formed by photophosphorylation.
2	A	What is the yield in terms of ATP during cellular respiration ? Ans: 1. Glycolysis - 2 ATP $2\ NADH_2 \times 3\ ATP = 6\ ATP$ 2. Oxidation of pyruvic acid to acetyl CoA $2\ NaDH_2 \times 3\ ATP = 6\ ATP$ 3. Krebs cycle 2 ATP $6\ NADH_2 \times 3\ ATP = 18\ ATP$ $2\ FADH_2 \times 2\ ATP = 4\ ATP$ Total 38 ATP

Q. No.	Obj.	Questions	Answers
3	U	What is oxidative phosphorylation ? How does it work. Ans: The electron transport system is a chain of hydrogen and electron acceptors embedded in the inner membrane of the mitochondrion. $NADH_2$ and $FADH_2$ are oxidised by transfer of electrons and protons to O_2 through electron transport chain during which energy rich ATP are produced. This is called oxidative phosphorylation. The electrons removed from a glucose molecule are all transferred to hydrogen acceptors NAD^+ and FAD^+ forming $NADH_2$ and $FADH_2$. These reduced components now enter the electron transport chain, where the high energy electrons are passed from one acceptor to another in a seris of reactions to form water and ATP molecules.	
4	K	Summarise the reactions of glycolysis. Ans: **Glycolysis Pathway (EMP Pathway)** Glucose ATP Hexokinase ADP Glucose-6-phosphate Hexose phosphoisomerase Fructose-6-phosphate ATP Phosphotructokinease ADP Fructose-1,6-diphosphate Ketophosphate aldehyde lyase Glyceraldehyde-3-phosphate <----------> Dihydroxyacetone phosphate P1 NAD Triosephosphate dehydrogenase NADH+H	

Q. No.	Obj.	Questions	Answers
			

TOPIC 4 : GROWTH AND DEVELOPMENT

CONTENT POINTS:

1. Growth is an outcome of cell-division, cell elongation, cellular differentiation leads to the formation of different tissues which bring in permanent change in the formation structure in the plant body.

2. Growth curve, log phase, lag phase, measurement of growth, relative growth rate, conditions necessary for growth, physical changes during the seed development, seed germination, physiology of germination, dormancy, causes and release, apical dominance, photoperiodism, flowering, role of cytochrome in flowering and germination, vernalisation, scession.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	An instrument used for measurement of longitudinal growth in plant is A. Auxanometer B. Potometer C. Hydrometer D. Osmometer	A
2	U	Growth promoting hormones are A. IAA, GA and ABA B. IAA, GA and ethylene C. IAA, ABA and cytokinin D. IAA, cytokinin, GA	D
3	K	Most rapid growth occurs during A. Lag phase B. log phase C. steady state D. senescence phase	B

Q. No.	Obj.	Questions	Answers
4	A	Relative growth rate is commonly measured in terms of increase in A. dry weight B. fresh weight C. length D. girth	A
5	U/A	The hormone which promote apical dominance is A. gibberellin B. kinetin C. auxin D. coumarin	C
6	K	Water content of most dry seeds is around A. 0% B. 5% C. 10% D. 20%	C
7	A	A seed with viable embryo which cannot germinate under appropriate condition is A. non-viable B. dormant C. dead D. deformed	B

Q. No.	Obj.	Questions	Answers
8	U	In case of epigeal germination A. cotyledons arise above ground level due to growth of hypocotyl. B. cotyledons are raised above ground due to growth of epicotyl. C. cotyledons are raised above ground due to growth of both epicotyl and hypocotyl.	A
9	U/K	Dry seeds take up water by A. imbibition B. osmosis C. absorption D. diffusion	A
10	A	Synthesis of hydrolysing enzymes during germination is induced by A. GA B. IAA C. ABA D. ethylene	A
11	K	Dormancy induced by seed coat can be overcome by A. scarification B. stratification C. after-ripening D. GA	A

Q. No.	Obj.	Questions	Answers
12	K	Growth of shoots is promoted by A. IAA B. GA C. ABA D. cytokinin	D
13	U	Perennials that flower only once during their life time are A. monogenetic B. monocarpic C. monoecious D. monocyclic	B
14	U	Flowering response of plants in relation to duration of day and night is called A. Phototropism B. Photoperiodism C. Photorespiration D. Photo-oxidation	A
15	A	Artificial ripening of fruits can be achieved by treatment with A. Auxins B. Cytokinin C. Gibberellin D. Abscisic acid	D

Q. No.	Obj.	Questions	Answers
16		Elongation of a genetically dwarf plant can be achieved by treatment with A. auxin B. cytokinin C. gibberrellin D. ethylene	C
17		When the dark period of short day plant is interrupted by a brief exposure to infrared light then the plant A. starts flowering B. remains vegetative C. becomes long day plant D. sheds its leaves	A
18		Pigments involved in perception of photoperiodic light stimulus is A. phytochrome B. cytochrome C. chalcone D. carotene	A
19		Physiologically active form of phytochrome is A. P680 B. P730 C. P860 D. P900	B

Q. No.	Obj.	Questions	Answers
20		In many plants vernalisation can be substituted by treatment with A. IAA B. GA C. ABA D. NAA	B
21		Leaf fall occurs when the content of A. auxin decreases B. giberellin decreases C. abscisic acid decreases D. ethlene decreases	C
22		Which of the following is absolutely necessary for germination ? A. Water B. Light C. Temperature D. Minerals	

Q. No.	Obj.	Questions	Answers
1	K	Who conducted experiments on Coleoptiles of oats ? A. Went B. Darwin C. Miller D. Calvin	A
2	A	What will happen if auxin is sprayed over the tubers during storage ? A. Root formation inhibited B. Quick formation of buds C. The tuber will decay D. Hasten rooting of tubers	A
3	A	The use of 2-4-D is A. for production of seedless fruits B. to prevent permature leaf fall C. as herbicide to eliminate dicot weeds D. to break dormancy of buds	C
4	A	The liquid endosperm of tender coconut water is rich in A. Cytokinins B. Auxins C. Gibberellins D. Ethylene	A

Q. No.	Obj.	Questions	Answers
5	U	The oragnism which causes Bakane disease in paddy is A. Alga B. Fungus C. Bacterium D. Virus	B
6	U	The patterns of growth is represented by A. Hormones B. Arc auxonometer C. Sigmoid curve D. Klinostat	C
7	K	The synthetic plant growth regulatory is A. NAA B. IAA C. GA D. Zeatin	A
8	K	Miller and his co-workers isolated cytokinin from A. Oats B. Zeamays C. tender coconut water D. sperm DNA of herring fish	D

Q. No.	Obj.	Questions	Answers
9	U	Apical dominance caused by IAA can be reversed by A. other auxins B. cytokinins C. Gibberellins D. ethylene	B
10	A	An instrument used to measure the growth in length of a potted plant. A. Klinostat B. Potometer C. Respiroscope D. Lever auxanometer	D
11	A	Sudden elongation of stem followed by flowering is called A. Curvature B. Budding C. Bolting D. Growth	C
12	U	Furfuryl amino purine is a/an A. Auxin B. Kinetin C. Gibberellin D. Abscisic acid	B

Q. No.	Obj.	Questions	Answers
13	U	Which one of the following statements is wrong ? A. Auxin stimulates respiration B. Auxin promotes premature fall of leaf C. Auxin stimulates cell division D. Auxin induces the formation of parthenocarpic fruits	B
14	A	The ageing process of plants is delayed by A. abscisic acid B. Gibberellin C. ethylene D. cytokinin	D
FILL IN THE BLANKS			
1	K	Growth and differentiation results in _____.	development
2	K	Organs like fruits, seeds, leaves show a pattern of_____ growth.	limited
3	K	The sigmoid growth curve has_____ phases.	three
4	K	The initial slow growing phase is called_____.	lag phase
5	K	The rapid growing phase is called_____	log phase
6	U	In annual plants, the steady state phase is followed by_____ and death.	senescence
7	K	Plant growth substances are grouped into_____ types.	three
8	K	'Auxin' in Greek means_____.	to grow

Q. No.	Obj.	Questions	Answers
9	U	_____ promote cell enlargement along the longitudinal axis of stem.	Auxins
10	U	Coleoptile auxin was known as_____.	Indole-3-acetic acid
11	K	_____ is used as herticede.	2,4-D
12	U	Bakane disease occurs in_____ plants.	rice
13	K	Gibberella fujikori is a_____.	fungus
14	A	Dormancy of bud is broken by_____.	Gibberellins
15	U	GAs can induce the formation of an enzyme_____ in the aleurone layer of barley.	amylase
16	U	Kinetin was isolated from_____ sperm DNA.	Herring
17	K	Chemical name of kinetin is_____.	6-furfuryl amino purine
18	K	In 1955_____ isolated kinetin.	Miller
19	K	Herring is a kind of_____.	fish
20	A	Apical dominance caused by IAA can be reversed by_____ treatment.	Kinetin
21	A	_____ delay the ageing process of plants.	Cytokinins
22	U	Plants require a specific_____ period for flowering.	photo
23	A	_____ is used to measure growth in plants.	Auxanometer

Q. No.	Obj.	Questions		Answers
MATCH THE FOLLOWING				
		A	B	
	K	1. Herring	a. Synthetic auxin	1-c
	K	2. Bakane disease	b. Measurement of growth	2-e
	K	3. 2-4-D	c. Fish	3-a
	A	4. Lever auxanometer experiment	d. Kinetin	4-b
	K	5. 6-furfuryl amino purine	e. Giberella fujikori	5-d
VERY SHORT QUESTIONS				
1	K	Name the growth promoting substance which is extracted from a fungus by Yabuta and Hayashi ?		Gibberellin
2	K	Name the substance which regulates the growth and development of plants.		Plant growth regulator
3	K	Who reported that photo induced movements were due to a substance present in coleoptiles ?		Boysen-Jenson
4	K	Who isolated the growth promoting substance from the coleoptiles of oats?		Went
5	U	Name the synthetic auxin which is more effective in the formation of roots on stem cuttings and anchorage of roots.		IBA
6	U	Name the hormone which inhibits the growth of axillary buds.		Auxins/IAA
7	U	Name the phenomenon of suppression of growth of lateral buds by terminal buds.		Apical dominance
8	U	Name the phenomenon of production of seedless fruits.		Parthenocarpy

Q. No.	Obj.	Questions	Answers
9	U	Name the phytohormone that induces phototropism and geotropism in plants.	Auxin
10	K	Name the theory which supports that auxins are responsible for geotropism ?	Went choladny theory
11	K	Name the phytohormone which activates cell division ?	Cytokinin
12	K	Name the phytohormone which changes bisexual flowers into unisexual flowers ?	Cytokinin
13	U	Name the plant growth regulator which promotes chlorophyll degradation ?	Abscisic acid
14	U	Name the chemical which will be used for weed control.	2,4-D
15	U	Fruits of tomato become red due to the development of lycopene. Name the phytohormone which is responsible for this ?	Abscisic acid
16	U	The sprouting of potato tubers is prevented by spraying a plant growth regulators. Name it ?	Abscisic acid
17	K	What is heliotropism ? Ans: Movement of growth and curvature in response to sunlight.	
18	K	What is morphogenesis ? Ans: Differentiation of tissue into buds, roots, etc.	

TOPIC 5 : GROWTH AND GROWTH HORMONES

CONTENT POINTS :

1. It is a complex phenomenon dealing with vital processes like cell divison, cell elongation, cell differ-entiation and morphogenesis regulated by specific chemical substances called growth hormones.
2. Growth is a natural and vital phenomenon characteristic of all living organisms.
3. It is an outcome of cell division and cell enlargement of new cells.
4. Cell elongation is followed by differentiation leading to formation of specialised tissues, forming organs accompanied by a permanent change in size and volume.
5. In plants, growth is localised in regions called meristems, seen in tips of orots, stem branches. A few plants organise secondary meristem called cambiam.

Hormones: 1. Auxins
2. Gibberellins
3. Cytokinins
4. Abscissic acid
5. Ethylene

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1		Growth movement in response to light stimulus is called A. Photoperiodism B. Phototropism C. Photolysis D. Photosynthesis	B
2		Indole acetic acid is A. amino acid B. hormone C. fatty acid D. alkaloid	B

Q. No.	Obj.	Questions	Answers
3		Gibberellin causes A. shortening of genetically tall plants B. elongation of genetically dwarf plants C. promotion of rooting D. yellowing of young leaves	B
4		The ripening of fruits can be accelerated by A. reducing the supply of water to plant when fruits are maturing. B. increasing the supply of nitrogen in the atmosphere surrounding them. C. warming up the surroundings artificially. D. artificially adding ethylene gas to the atmosphere surrounding them.	D
5		Leaf fall occurs when the content of A. auxins increases B. auxins decreases C. abscisic acid decreases D. gibberlic acid decreases	B
6		In unisexual plants sex can be changed by application of A. ethanol B. auxins (ethylene) C. cytokinins D. ABA	A

Q. No.	Obj.	Questions	Answers
7		The following is a growth inhibitor A. IAA B. ABA C. NAA D. GA	B
8		Substances which originate at the tip of the stem and control the growth are A. vitamins B. enzymes C. food materials D. auxins/hormones	D
9		What causes a green plant to bend towards light as it grows. A. Because green plants need light to carry out photosynthesis. B. Because green plants are phototropic C. Light stimulates plant cells on the lighter side to grow faster. D. Auxins accumulate on the shaded side stimulating greater cell elongation.	D
10		Apical dominance in higher plants is due to A. balance between auxins and cytokinins B. enzyme activity C. carbohydrate supply D. photoperiodism	A

Q. No.	Obj.	Questions	Answers
11		Which is called as grand period of growth ? A. Cell elongation period B. Lag phase C. Log phase D. Cell differentiation period	C
VERY SHORT ANSWER QUESTIONS			
1		Explain how geotrophic movements caused by auxins ? Ans: Growth of a plant in response to gravity is called geotropism. When a plant is kept horizontally, auxin accumulates on the lower side of stem apex and root apex. Presence of more auxin on the lower side of stem apex causes more growth on that side of stem apex causes more growth on that side, so it turns upwards. But presence of more auxin in the root has a negative effect. It inhibits growth on the lower side, so the root apex turns downwards. It is also called Went theory.	
2	U	What are the effects of cytokinins in plants ? Ans: The cytokinins are detected in the milk of coconut. They cause many physiological effects on plants. a. Cell division - It induces cell division in the presence of sufficient amount of auxin in tobacco pith callus, soya bean cotyledon, etc. b. Cell enlargement: Significant cell enlargement has been observed after cytokinin treatment in leaf. c. Cytokinins can induce formation of interfascicular cambium. d. Cytokinins can also cause morphogenetic changes in tobacco pith, callus. e. Dormancy of seeds - The dormany of certain light sensitive seeds of lettuce, tobacco can be broken by treatment with cytokinins in dark.	

Q. No.	Obj.	Questions Answers
3	U	What is the physiological role played by (ABA) Abscisic acid? Ans: ABA has a number of physiological effects on plants in inducing abscisson and dormancy. a. It regulates the dormancy of buds and seeds. b. It accelerates the senescence of leaves. c. It acts as an "anti-gibberellin". d. It causes aging and abscission of leaves. e. It may inhibit RNA, protein synthesis or biosynthesis of growth harmones.
4	U	How gibberellins cause physiological effects on plants ? Ans: Gibberellns are widely used for growth promoting properties. a. Seed germination - Some light sensitive seeds of lettuce and tobacco show poor germination in dark. It is overcome if the seeds are treated with gibberellic acid in dark. b. Dormancy of buds - Some buds formed in autumn remain dormant due to severe cold. This dormancy can be broken by treatment with gibberellin. c. Elongation of internodes - Many plants like dwarf pea, dwarf maize, etc. overcome the genetic dwarfism when treated with gibberellin which induces elongation of internodes. d. Bolting and flowering - Some plants under short days show rosette habit with short stem and cauline leaves, while under long days bolting occurs. This bolting can be induced evn in short days by the application of gibberellin. e. Parthenocarpy - Germination of pollen grains, the growth of the fruit, and formation of parthenocarpic fruits can be induced by gibberellin treatment.
5	K	What are auxins ? Explain natural and synthetic auxins ? Ans: Auxins are a kind of phytohormones that promote longitudinal growth in plants. They are endogenous in nature. It is chemically known as Indole Acetic Acid (IAA). There are many natural and synthetic auxins:

Q. No.	Obj.	Questions Answers
		A. Natural auxins - The auxins that occur in plants are called natural auxins. a. Indole-3-acetic acid b. Indole-3-acetaldehyde c. Indole-3-Pyruvic acid B. Synthetic auxins - The auxins artificially synthesized are called synthetic auxins. a. Naphthalene acetic acid (NAA) b. Indole butyric acid (IBA) c. Indole propionic acid (IPA) d. 2-4 Dichlorophenoxy acetic acid (2,4-D) e. 2-4,5 Trichlorophenoxy acetic acid (2,4,5-T)
LONG QUESTIONS		
1	A	What are the physiological effects of ethylene application on plants ? Ans: Ethylene is a gaseous phytohormone for growth inhibition. It is a volatile gas. **Effects:** 1. Cell enlargement - It promotes cell expansion in transverse plane resulting in swelling of plant parts. 2. Geotropism - Ethylene modifies the geotropic response in etiolated pea seedlings causing transverse geotropism. 3. Abscission - Senescence and abscission of leaves and flowers takes place when ethylene is applied. 4. Fruit ripening - Ripening of fruits is due to the production of ethylene. Fruits can be stored for longer period by removing ethylene or by increasing CO_2 concentration. 5. Inhibition of floral bud opening - The 'sleep disease', by rolling of petals in flowers is caused by ethylene. It prevents the opening of flower bud. 6. Epinasty in leaf - 'Epinasty', i.e. more growth on upper side of petiole than on lower side can be caused by ethylene treatment to promote drooping of leaves.

Q. No.	Obj.	Questions Answers
		7. Other effects - a. Inhibition of callus growth. b. Exudation of sap and latex. c. Geotropic growth in some plant parts is also caused by ethylene application.
2	K	Given an account of the role of phytohormones in agriculture and horticulture. Ans: Phytohormones have many useful applications in agriculture and horticulture. The biotechnological techniques, tissue culture, clonal propagation mainly involves the use of different plant hormones. Phytohormones are endogenous organic substances which influence plant growth. They are used in many ways. A. Vegetative propagation - The plants propagated by stem cuttings are applied with auxins like NAA, IBA to induce root development in stem cuttings. B. Flowering - Gibberellins induce flowering in long day plants during short days, and in short day plants during long days. IAA, NAA promote flowering. C. Dormancy - Dormancy of buds and seeds is broken by gibberellins and cytokinins. D. Parthenocarpy - Parthenocarpy may be induced by application of IAA, IBA, NAA and gibberellins to obtain seedless varieties of fruits. E. Weed control - Phytohormones like 2,4-D, 2, 4,5-T, MCPAC (methyl chlorophenoxy acetic acid) are used as herbicides to eliminate dicot weeds. F. Prevention of leaf and flower fall - Abscission is caused due to abscissic acid secretion in the plants. It is controlled by spraying the auxins to prevent the premature fall of leaves and flowers. G. Promotion of leaf fall - Machine harvest of cotton needs prior defoliation of plants. Endothal, sodium chlorate, calcium cyanamide are used as defoliants. H. Protection from water stress - The loss of water due to transpiration in plants growing in dry areas can be checked by spraying ABA which induces closure of stomata.

Q. No.	Obj.	Questions Answers
		I. Ripening of fruits - a. Ethylene promotes ripening, maturation of fruits. Removal of ethylene delays ripening. b. Ethylene induces prolonged exudation of latex from rubber tree. c. Formation of female flowers in cucurbits is due to application of auxins. d. Spraying of auxins prevents sprouting of potatoes, onions, etc. e. By treatment of auxins the number, size of root modules of legumes may be increased.
3	K	Give an account of growth in plants and the factors affecting it. Ans: Growth is an outcome of cell division, cell elongation, cellular differentiation which leads to the formation of different types to tissues to bring about permanent change in the form and structure of plant body. Growth is confined to meristems of root and shoot apices at early stage and in older parts, secondary meristems give rise to additional tissues. There are three regions or zones of growth in a root. a. Region of cell division - It is represented by the apical meristem which has cells dividing mitotically, protected by root cap. b. Region of cell elongatiion - Cells derived from cell division undergo elongation or enlargement. c. Region of cell differentiation - The cells present in different parts of the root differentiate into tissues like, cortex, xylem, phloem, etc. Phases of growth - The phases of growth are represented by the regions of cell division and cell elongation, and cell different-iation, which are controlled by plant hormones. Growth curve - Growth is slow at the beginning, it rapidly increases and finally slows down and stops. The rate and time of growth is represented graphically and shows "S" or sigmoid curve.

Q. No.	Obj.	Questions	Answers
		Factors effecting growth I. Environmental factors - The environment in which the plant grows exercise certain influence over growth. A. Temperature: The plants in arctic or alpine zones may grow at even freezing point and their optimum growth temperature is less than 10°C. The plants in temperate zone do not grow below 5°C. Optimum temperature is 25°C to 30°C and the maximum is 30°C to 40°C. B. Light - Light influences plant growth according to its intensity, duration and quality. Plants show etiolation in prolonged darkness and the plants growing in light possess short internodes and broad leaves. The quality of light has a varying influence on growth. The duration of light, conditions the growth of plant and has marked influence on flower and fruit development. C. Water and Mineral Salts - Water is essential for the enlarge-ment phase of cells in the growing regions. In addition the major elements, special micro elements in traces are essential for healthy growth of plants. Plants developing under adverse water, mineral conditions are stunted in their growth. II. Internal or Plant Factors A. Phyto hormones - Growth promoting hormones can be grouped: a. Auxins b. Gibberellins c. Cytokinins d. Ethylene B. Growth inhibitors - The chemical substances like (1) Abscissic acid and (2) Ethylene and their influences on plant growth which inhibit in various ways are to be discussed.	

UNIT II : MORPHOLOGY OF ANGIOSPERMS

TOPIC 6 : ROOT MORPHOLOGY AND STEM MORPHOLOGY (VEGETATIVE MORPHOLOGY)

CONTENT POINTS :

1. Root is a positively geotropic, whitish brown in colour without nodes, internodes, leaves and buds and with unicellular root hairs.

2. Its main function to give anchorage to the plant, and absorption of water and minerals.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The part of the stem where leaf is attached is called A. Internode B. Axil C. Node D. Bud	C
2	U	The normal functions of the root are A. anchorage and absorption B. fixation, absorption and mechanical support C. fixation or anchorage D. fixation and translocation	A
3	U	The special type of spongy like tissue found in Vanda root is called A. Sclereide B. Velamen C. Companion cell D. Aerenchyma	B

Q. No.	Obj.	Questions	Answers
4	U	Which is modified in beet root ? A. Stem B. Tap root C. Adventitious root D. Rootlet	B
5	U	Find out the wrong statement A. The aerial roots of banyan are adventitious B. The prop roots found in banyan are for mechanical support C. The prop roots grow in horizontal and downward positions D. The normal roots of banyan are tap roots.	C
6	U	The root if swollen in the middle and gradually tapering towards both ends like a spindle, this type of root is called A. Conical root B. Napi form root C. Prop root D. Fusiform root	D
7	U	Which part of the embryo develops into the stem ? A. Plumule B. Radicle C. Cotyledon D. Hypocotyl	A

Q. No.	Obj.	Questions	Answers
8	U	Biennials are A. plants which complete their life cycle within a few months B. plants which live for a number of years C. plants which live for many years but produce flowers and fruits only once D. plants which remain vegetative for the first year and utilise second year for reproductive activity.	D
9		Which one of the following is not an underground stem. A. Sucker B. Bulb C. Tuber D. Rhizome	A
10	U	An example for monocarpic perennial is A. Carrot B. Mustard C. Agave D. Mango	C
11	U	The medium sized plants with bushy appearance are called A. Trees B. Shrubs C. Herbs D. Annuals	B

Q. No.	Obj.	Questions	Answers
12	U	The type of stem in <u>Chrysanthemum</u> is A. runner B. sucker C. stolon D. offset	B
13	A	Which of the following characters is common for both tuberous root and underground stem ? A. Non-green colour B. Nodes and internodes C. Axillary and terminal buds D. Scale leaves	A
14	U	Find out in which case stem is not modified ? A. <u>Opuntia</u> B. Ginger C. <u>Clitoria</u> D. <u>Chrysanthemum</u>	C
15	U	The nature of bean stem is A. slender and with short internodes B. slender, coiled and with long internodes C. short and thick D. short, horizontal and coiled	B
16	U	A common character found in the plants with underground stems is A. stems with scale leaves B. food stored inside the stem C. growth of the stem is horizontal D. vegetative reproduction	D

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	U	The stolon is a type of_____ stem.	subaerial
2	K	Bamboo is a_____ perennial	monocarpic
3	K	_____ are the plants germinate, grow, produce flowers and fruits and die within a few months.	annuals
4	K	The leaves found in the underground stem are called_____.	scale leaves
5	K	In suckers the lateral branches develop from the_____ buds.	axillary
6	K	_____ and_____ are the normal functions of the stem.	support, conduction
MATCH THE FOLLOWING			
		A B	
	U	1. Underground stem a. Runner	1-d
		2. Annual b. Twiner	2-c
		3. Subaerial stem c. Paddy	3-a
		4. Shrub d. Corm	4-e
		5. Clitoria e. Hibiscus rosa-sinensis	5-b

SHORT ANSWER TYPE QUESTIONS

1 K What is axillary bud ?

Ans: A bud seen in the region of the axil of the stem is called axillary bud. Axillary buds bring about lateral growth.

2 U Fibrous roots of monocots are a type of adventitious roots. Explain.

Ans: The development of fibrous roots of monocots is not directly from the radicle and instead the radicle is replaced by several roots of equal size arising from the lower most node of the stem.

Q. No.	Obj.	Questions	Answers
3	U	Distinguish between vegetative organs and reproductive organs.	Ans: The vegetative organs of a plant are root, stem and leaf they are responsible for the vegetative growth of a plant and not take part the reproduction directly whereas flower, fruit and seeds are the reproductive organs and they are directly connected with the reproduction.
4	U	What do you mean by exogenous in origin ?	Ans: The origin of leaves and branches of the stem is from the outer layers (superficial layers). That is why the origin is called exogenous.
5	K	Define a bud.	Ans: The buds are rudimentary shoots and are capable of growing into new shoots under favourable conditions.
6	U	What are polycarpic perennials ? Cite an example.	Ans: They are plants which live for a number of years and produce flowers and fruits every year. Ex: Mango or Tamarind.
LONG ANSWER TYPE			
1	K	Enumerate the modification of tap roots you have studied.	Ans: 1. Conical root - carrot The tuberous root is broadest at the top and gradually tapers towards the apex like a cone. 2. Fusiform root - Radish The root is swollen in the middle and gradually tapering towards both ends like a spindle. 3. Napiform root - Beetroot The root is considerably swollen at the upper part and suddenly tapering below to form a tail like structure.

Q. No.	Obj.	Questions Answers
2	K	List out the general characteristic features of root. Ans: 1. The roots are positively geotropic and negatively phototropic. 2. The branch roots are endogenous in origin. 3. They are branched and brown in colour. 4. nodes and internodes are absent. 5. Root hairs and root cap present.
3	K	What are the advantages of underground stem ? Ans: 1. Underground stems are protected from attack by animals. 2. Underground stems function as organs of perennation. 3. They are also useful for vegetative propagation. 4. They store reserve food materials more than aerial stems. 5. They are able to protect themselves aginst unfavourable conditions of weather.
4	K	Write short notes on rhizome. Ans: 1. Rhizome is a short, horizontal and thick underground stem. 2. It is provided with distinct nodes and internodes. 3. It bears some scale leaves at nodes. 4. It has terminal, axillary buds. 5. The stem is thick, fleshy due to excessive storage of food materials.

TOPIC 7 : LEAF MORPHOLOGY

CONTENT POINTS :

The study of forms and features of different plant organs including their development is called morphology, specifically about leaf.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	The scale leaves perform the function of A. photosynthesis B. transpiration C. protection D. guttation	C
2	K	The veins of the leaf are useful for A. transport of water B. transport of minerals C. transport of organic substances D. all the above	D
3	K	Which of the following shows reticulate venation ? A. Musa B. Canna C. Paddy D. Castor	D

Q. No.	Obj.	Questions	Answers
4	U	When the petiole is modified into flat green leaf like structure, it is A. Phyllode B. Cladode C. Phylloclade D. Phyllum	A
5	U	Which part of the leaf is not found in <u>Calotropis</u> ? A. Lamina B. Petiole C. Leaf base D. Veins	B
6	U	The veins are in reticulate pattern and they are converging at the apex in A. <u>Cucurbita</u> B. grass C. mango D. <u>Zizyphus</u>	D
7	K	Find out the phyllotaxy in Guava. A. Opposite and superposed B. Opposite and decussate C. Alternate D. Ternate	A
8	U	Which part is modified into pitcher in <u>Nephenthis</u> ? A. Petiole B. Leaf base C. Leaf margin D. Leaf lamina	D

Q. No.	Obj.	Questions	Answers
9	U	The leaflets arise from the tip of the petiole radiating out like the fingers of a hand in A. pinnately compound leaf B. bipinnately compound leaf C. palmately compound leaf D. none of the above	C
10	U	The leaf base of Fabaceae is swollen and it is called A. Pulvinus B. Phyllode C. Rachis D. Sheathing leaf base	A
FILL IN THE BLANKS			
1	U	The stipules give protection to the _____.	axillary buds
2	U	_____ type leaves are for photosynthesis.	Foliage
3	U	In_____ type of venation there is a single prominent strong midrib and the lateral veins are like pinnae of a feather.	pinnately reticulate
4	K	The venation found in Palmyra leaf is _____.	palmately parallel divergent
5	U	The petiole modification is known as _____.	phyllode
6	U	_____ type of phyllotaxy is found in Allamanda.	Whorled
7	U	Nepenthes is an_____ plant.	insectivorous
8	U	The functions of the veins are_____ and_____.	conduction, mechanical support

Q. No.	Obj.	Questions		Answers
MATCH THE FOLLOWING				
	K	1. Ternate	a. <u>Acacia melanoxylon</u>	1-d
	K	2. Nepenthes	b. Compound leaf	2-c
	K	3. Rachis	c. Insectivorous plant	3-b
	U	4. Veins	d. Nerium	4-e
	U	5. Phyllode	e. Conduction	5-a
SHORT ANSWER QUESTIONS				
1	U	What is the function of foliage leaves ? Ans: The green leaves performing the function of photosynthesis are called foliage leaves.		
2	U	What is meant by sheathing leaf base ? Give an example. Ans: The leaf base is broad and wing like to clasp the stem such leaf base is called sheathing leaf base. Ex. Monocot leaf		
3	K	Define phyllotaxy. Ans: The mode of arrangement of leaves on the stem.		
4	K	What are stipules ? Ans: Stipules are small green appendages at the point of juncture of petiole and stem.		
5	U	Mention the differences between phyllode and phylloclade. Ans: Phyllode iis a leaf petiole modification, phylloclade is a stem modification. The work of photosynthesis is carried out by the petiole in phyllode, whereas the stem does the function of photosynthesis in phylloclade. Phyllode is not involved in vegetative reproduction, phylloelade helps in vegetative reproduction.		

Q. No.	Obj.	Questions	Answers
6	U	What type of venation is found in a. Bamboo b. Castor Ans: Bamboo - Palmately parallel and convergent Castor - Palmately reticulate and divergent	
7	U	Differentiate compound leaf from simple leaf. Ans: 1. Simple leaf has single lamina, in compound leaf the lamina is divided into many small leaflets. 2. Simple leaves are arranged on the branch in acropetal succession whereas the leaflets of compound leaf show acropetal succession.	
LONG ANSWER QUESTIONS			
1	U	Citing one example for each explain the different types of phyllotaxy. Ans: 1. Alternate - Polyalthia only one leaf at each node. 2. Opposite - a. Superposed - Guava b. decussate - Calotropis There are two leaves at a node arranged opposite to each other. 3. Ternate - Nerium The successive opposite pairs of leaves are arranged at right angle to one another. 4. Whorled - Allamanda In this type there are more than three leaves at each node arrnaged in a circle.	
2	A	What is phyllode ? Explain with reference to Acacia melanoxylon. Ans: The petiole of the leaf is modified and becomes flattened, green and leaf like. In Acacia melanoxylon the young leaves are bipinnately compound. The leaflets are shed to reduce transpiraton. The primary rachis is modified to perform photosynthesis.	

Q. No.	Obj.	Questions Answers
3	K	Describe leaf modification in Nepenthes. Ans: a. Nepenthes is commonly called pitcher plant, it is an insectivorous plant. b. The upper part of the petiole is long, thin and coiled formng a tendril. c. The lower part of the petiole is compressed like a leaf. d. The lamina is modified into pitcher. e. There is a lid for the pitcher and the rim is beautifully coloured.
4	U	What are the different types of venation ? Give examples. Ans: A. Reticulate venation a. Pinnately reticulate venation (mango) b. Palmately reticulate venation (i) Divergent - Castor (ii) Convergent - Zizyphus B. Parallel venation a. Pinnately parallel venation b. Palmately parallel venation (i) Divergent - Palm (ii) Convergent - Grass

TOPIC 8 : INFLORESCENCE

CONTENT POINTS:

The floral region consisting of a collection of flowers is known as the inflorescence. There are two types, one is Racemose and the other is Cymose.There are also special types of inflorescence like cyathium verticillaster hypanthodium thyrsus.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	In which inflorescence centripetal development seen A. Cymose B. Racemose C. Mixed type D. Special type	B
2	K	The main axis of inflorescence is called A. Petiole B. Peduncle C. Pedical D. Stipule	B
3	K	The inflorescence of mustard is A. raceme B. cyme C. spadix D. capitulam	A

Q. No.	Obj.	Questions	Answers
4	U	The type of inflorescence found in Asteraceae A. Raceme B. Spadix C. Capitulum D. Cymose	C
5	U	In which one of the following dichasial cyme is found. A. Jasmine B. Tridax C. Launaea D. Clerodendran	D
6	K	Homogamous head inflorescence having all ray florets is found in A. Launea B. Tridax C. Vernonia D. Helianthus	A
7	U	Which one of the following represents special leaves at whose axils flowers develop. A. Pedicel B. Stipule C. Bracteole D. Bract	D

Q. No.	Obj.	Questions	Answers
8	K	What type of inflorescence is found in mango ? A. Compound raceme B. Panicle C. Spike D. Umbel	A
9	U	Name the inflorescence with involucre of bracts. A. Raceme B. Cymose C. Head or Capitulum D. Compound raceme	C
10	U	In which inflorescence basipetal succession is present. A. Special type of inflorescence B. Racemose C. Mixed type of inflorescence D. Cymose inflorescence	D
FILL IN THE BLANKS			
1	K	Growth of axis is indefinite in _____ inflorescence.	racemose
2	K	Spadix is found in_____ only.	monocoty-ledons only
3	K	Flowers are sessile in_____ inflorescence.	spike
4	U	The whole inflorescence is enclosed by a large brightly coloured bract called _____.	Spathe

Q. No.	Obj.	Questions	Answers
5	K	The inflorescence present in Mangifera is_____.	compound raceme or panicle
6	K	Cyathium is a_____ type of inflorescence.	special type
7	K	The arrangement of flowers is in ascending order in_____ successoin.	acropetalous
8	K	Compound raceme is also known as _____.	panicle
9	K	Head inflorescence is otherwise known as_____.	capitulum
10	K	Disc florets are also known as_____ florets.	tubular

MATCH THE FOLLOWING

	A	B	
U	1. Launea	a. Dichasial cyme	1-d
U	2. Crotalaria	b. Heterogamous head	2-f
U	3. Peduncle	c. Simple cyme	3-e
U	4. Clerodendran	d. Homogamous head	4-a
U	5. Receptacle	e. Inflorescence axis	5-g
U	6. Tridax	f. Simple raceme	6-b
U	7. Jasmine	g. Tip of the floral axis	7-c

SHORT ANSWER TYPE QUESTIONS

1 U What is the fundamental difference between simple raceme and spike ?

Ans: Flowers are pedicellate in simple raceme and sessile in simple spike.

Q. No.	Obj.	Questions	Answers
2	U	In what respect homogamous head differs from heterogamous head inflorescence ?	Ans: Homogamous head consists of one type of floret (either ray florest or disc floret). Heterogamous head consists of two types of florets (both ray florets and disc florets).
3	A	Why head inflorescence is considered as advanced type?	Ans: 1. Compact aggregation of florets 2. A single insect can pollinate many florets at a time 3. Presence of involucre of bracts
4	K	Mention the salient features of spadix.	Ans: It consists of sessile and unisexual flowers on a fleshy peduncle in acropetalous succession. Entire inflorescence is covered by an enlarged bract called spathe.
5	A	Cyathium is an inflorescence but not a flower.Comment.	Ans: Cyanium is considered to be an inflorescence based on the following characters. a. Presence of involucre b. Presence of jointed stamens which represents staminats flowers. c. Stamens surround the single naked female flowers represents pistilate flower d. The ovary shows tricarpellary nature. As it has two kinds of flowers it is an inflorescence but not a flower.
6	U	Which inflorescence is considered to be a modified head inflorescence. Mention the special features in it.	Ans: Hypanthodium: In this inflorescence the peduncle is modified into a fleshy hollow cup like structure with an apical pore. Inside the hollow cup-like structure the female flowers are present at the bottom and male flowers are present near the opening, gall flowers may be present in between them.

Q. No.	Obj.	Questions	Answers
7	U	Why the flowers in a Corymb inflorescence are present at the same level ?	Ans: In Corymb inflorescence the older flowers bear longer pedicels and younger ones bear shorter pedicels. Hence all the flowers are brought to the same level.
8	K	What is an inflorescence ? How are they classified ? What is the basis for this classification ?	Ans: 1. A groups of flowers arranged over an axis is called an inflorescence. 2. The inflorescences are classified into four types based on the nature of peduncle arrangement of flowers and opening of flowers. They are racemose, cymose, mixed type and special type.
9	K	What are the characters shown by solitary cyme ?	Ans: An inflorescence with a single opened flower is called solitary cyme. The inflorescence axis terminates in a flower.
LONG ANSWER QUESTIONS			
1	K	How is inflorescence classified on the basis of arrangement of flowers ?	Ans: 1. Racemose-When the flowers in an inflorescence are arranged acropetally on the main axis which has an unlimited growth, it is called a racemose inflorescence. 2. Cymose - When the flowers in an inflorescence are arranged basipetally it is called cymose inflorescence. 3. Mixed type - If the inflorescence is partly racemose and partly cymose it is called mixed type. 4. Special type.
2	K	Describe the head inflorescence.	Ans: 1. Peduncle is modified into a form of disc. 2. Flowers (florets) are sessile. 3. One or more whorls of bracts at the base of receptacle form involucre. 4. Mode of opening of flowers is centripetal.

Q. No.	Obj.	Questions Answers
3	K	What are the salient features of racemose inflorescence ? Ans: 1. Inflorescence axis not terminatiing in a flower. 2. Indefinite number of flowers. 3. Centripetal method of opening. 4. Flowers are arranged in acropetalous succession
4	K	What are the salient features of cymose inflorescence? Ans: 1. Definite inflorescence. 2. Inflorescence axis terminates in a flower. 3. Basipetalous succession or centrifugal opening of flowers.
5	U	What are the types of racemose inflorescence. Write suitable examples. Ans: 1. Simple raceme - Crotalaria 2. Compound raceme or panicle - Mangifera 3. Spike - Achyranthes 4. Spadix - Colocasia 5. Head - Tridax 6. Corymb - Cassia 7. Umbel - Allium cepa 8. Compound spadix - Musa or cocos 9. Spikelet - Paddy 10. Compound umbel - Coriandrum

(b) REPRODUCTIVE MORPHOLOGY

TOPIC 9 : FLOWER

CONTENT POINTS

Flower is a modified shoot, sepals, petals, stamens and carpels are modified vegetative leaves, as whole the flower is a modified shoot or leaf bud. Flowers are said to be symmetrical, when it can be divided into exactly two equal halves by any vertical section passing through the centre, it is known as actinomorphic or regular when the flower can be divided only in two halves in one plane only it is zygomorphic.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	Arrangement of petals in bud condition is known as A. Venation B. Adnation C. Aestivation D. Cohesion	C
2	U	Coloured structures in <u>Bougainvillea</u> are A. Sepals B. Petals C. Bracts D. Stamens	C
3	U	Parietal placentation is seen in A. Mustard B. Bean C. <u>Crotalamia</u> D. Wheat	A

Q. No.	Obj.	Questions	Answers
4	K	The carpel of flower consists of A. ovary B. ovary and style C. ovary, style and stigma D. ovary style, stigma and thalamus	C
5	K	Gynobasic style is found in A. Labiatae or Lamiaceae B. Gramineae C. Liliaceae D. Compositae	A
6	U	In angiosperms, an ovule represents A. a megaspore B. a megasporangium C. a megasporophyle D. a megaspore mother cell	B
7	U	In which one of the following family diadelphous condition is seen ? A. Malvaceae B. Asteraceae C. Fabaceae D. Musaceae	C
8	U	When the calyx drops off as soon as the flower opens, it is known as A. caducous B. deciduous C. accrescent D. persistent	A

Q. No.	Obj.	Questions	Answers
9	K	The stalk of the flower is called A. Peduncle B. Rachis C. Pedicel D. Petiole	C
10	U	In which one of the following epicalyx is found A. Tridax B. Hibiscus C. Clitoria D. Clerodendron	B
11	U	In a floral formula the symbol O denotes A. half actinomorphic B. half zygomorphic C. actinomorphic D. zygomorphic	C
12	U	In a floral formula epipetalous stamens are shown as A. $\overline{AC}$ B. $\overline{GA}$ C. C-A D. $\overline{CA}$	D

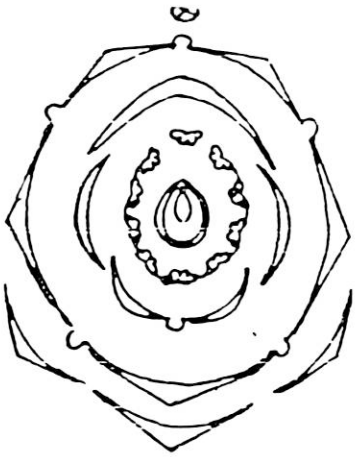
Q. No.	Obj.	Questions	Answers
13	U	The type of aestivation in Annona is A. Imbricate B. Twisted C. Valvate D. Quincuncial	C
14	K	The distribution of placenta inside the ovary is known as A. Aestivation B. Termination C. Placentation D. Venation	C
15	U	Monadelphous conditoin is seen in A. Malvaceae B. Musaceae C. Asteraceae D. Euphorbiaceae	A
FILL IN THE BLANKS			
1	K	Flowers with only one accessory whorl are called_____.	Monochla-mydeous
2	K	Papaya is an example of a_____ plant.	dioecious
3	K	Perianth is made up of_____.	tepals
4	K	The actinomorphic flowers exhibit _____ symmetry.	radial
5	U	Tetramerous and pentamerous flowers are common in_____.	dicots
6	K	Flowers having superior ovary are described as_____.	hypogynous

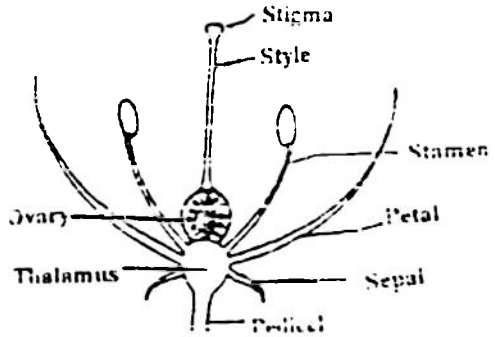
Q. No.	Obj.	Questions	Answers
7	K	When the calyx remains attached to the ripe fruit it is known as_____.	persistent
8	K	Twisted aestivation is also known as _____.	contorted
9	U	Stamens are otherwise known as_____.	microsporo-phylls
10	U	A gynoecium having free carpels is termed as_____.	Apocarpous
11	K	Cucumber exhibits_____ placentation.	Parietal
12	K	In a floral diagram, a cross, a dot or a small circle represents_____ side of flower.	posterior side
13	K	The distribution of placenta inside the ovary is known as_____.	placentation
14	K	Achlamydeous flowers are seen in _____.	Euphorbia sp
15	U	The accessory whorl in monocots and monochlamydeae is known as_____.	Perianth
16	K	_____ is polygamous.	Mango
17	K	_____ flowers exhibit bilateral symmetry.	Zygomorphic
18	U	The primary function of_____ is to attract insects for cross pollination.	Corolla
19	K	_____ is a kind of ground plan showing the arrangement of floral parts in a cross section of a flower bud.	Floral diagram
20	U	The symbol 'K' or 'Ca' represents _____.	Calyx

Q. No.	Obj.	Questions		Answers
MATCH THE FOLLOWING				
		A	B	
	K	1. Calyx	a. Papaver	1-e
	U	2. Asymmetrical	b. Hibiscus	2-g
	U	3. Persistent stigma	c. Ray florets	3-a
	U	4. Annona	d. Tridax	4-h
	U	5. Actinomorphic	e. Accessary organ	5-b
	U	6. Ligulate	f. Ocimum	6-c
	K	7. Syngenesious	g. Canna	7-d
	U	8. Monocarpellary pistil	h. Valvate aestivation	8-j
	U	9. Gynobasic style	i. Mustard	9-f
	U	10. Cruciform - corolla	j. Bean	10-i
SHORT ANSWER QUESTIONS				
1	U	What is the position of ovary in a hypogynous and an epigynous flower ? Ans: Hypogynous - ovary superior Epigynous - ovary inferior		
2	K	What are syngenesious stamens ? Ans: Anthers united into a bundle and filaments are free.		
3	U	Explain the term aestivation. Ans: Arrangement of sepals and petals with respect to each other in a floral bud.		
4	K	What are didynamous stamens ? Give examples. Ans: Out of four stamens two are long and two are short. Ex. Ocimum.		

Q. No.	Obj.	Questions	Answers
5	K	What are tetradynamous stamens ? Give examples.	Ans: Out of six stamed four are long and two are short. Ex: Raphanus
6	A	Explain the terms with suitable example. - Epiphyllous and Epipetalous.	Ans: Epiphyllous - Stamens unite with perianth. Ex: Asparagus Epipetalous - Stamens unite with petals Ex: Datura
7	U	Name the four kinds of floral leaves.	Ans: Sepals, petals, stamens and carpels.
8	U	By what name you call the sterile stamens and sterile pistils ?	Ans: Sterile stamens - Staminodes. Sterile pistils - Pistilodes
9	U	What is descendingly imbricate aestivation ?	Ans: The overlapping of margins proceeds from posterior to anterior sides of the flower.
10	U	What are Achlamydeous flowers ?	Ans: Perianth absent and flowers appear naked.

LONG ANSWER QUESTIONS

1	S+U	Draw the floral diagram of Clitoria ternatea and write down the floral formula.	Ans:  Br, Brl, %, O, K_5, C_5, $A_{(9)+1}$, G_1

Q. No.	Obj.	Questions Answers
2	K	What is placntation ? What are the types of placentation ? Ans: The distribution of placenta inside the ovary is known as placentation. Types - Marginal, Axile, Parietal and Basal
3	S	Draw the L.S. of a typical flower and label the parts. Ans:  Parts - Pedical, Thalamus, Sepal, Petal, Stamen,Ovary.
4	K	Describe various types of aestivation. Ans: Valvate - <u>Annona</u> Twisted - Petals of <u>Malvaceae</u> flowers Imbricate - Descendingly imbricate - Corolla of Fabaceae flowers Ascendingly imbricate - Caesalpiniaceous flower
5	K	What is the terminology used in the description of the Corolla ? Ans: Polypetalous, Gamopetalous, Regular and Irregular

TOPIC 10 : FRUITS

CONTENT POINTS:

The flower grows into the fruit, it is commonly known as the time-fruit, on the basis of dehiscence they have been classified into two types: dehiscent and indehiscent. They have been classified into, simple, aggregate and multiple or composite fruits.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	The edible part of mango is A. Epicarp B. Mesocarp C. Endocarp D. Seed	B
2	U	Which one of the following fruits is an example of a pome ? A. Mango B. Lemon C. Grape D. Pear	D
3	U	Fleshy edible part of jack fruit is derived from A. bract B. bracteole C. perianth D. floral axis	C

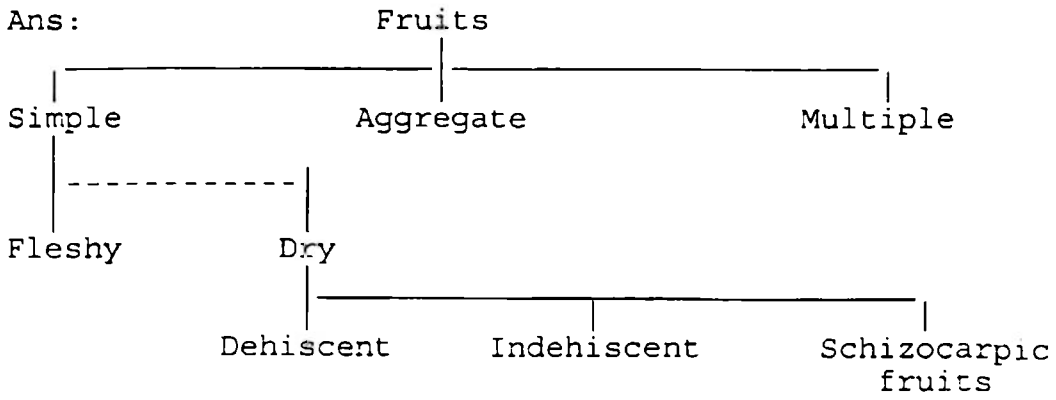
Q. No.	Obj.	Questions	Answers
4	U	The groundnut is a A. folicle B. capsule C. nut D. legume	D
5	U	Development of fruits without fertilisaton is called A. Vivipary B. Parthenocarpy C. Ovipary D. Agamy	B
6	U	Which of the following fruits is a cremocarp ? A. Coriandrum B. Ocimum C. Acacia D. Ricinus	A
7	U	A multiple fruit develops from A. apocarpous ovary of a single flowerr B. an inflorescence C. syncarpous ovary of a single flower D. none of the above	B
8	U	A simple fruit develops from A. syncarpous ovary of a single flower B. apocarpous ovary of a single flower C. an inflorescence D. all the above	A

Q. No.	Obj.	Questions	Answers
9	U	The fruit of castor is A. Regma B. Cremocarp C. Lomentum D. Berry	B
10	U	The ediible part in the citrus fruit is A. receptacle B. juicy hair C. endocarp D. epicarp	A
11	U	Fruits are absent in A. monocots B. dicots C. gymnosperms D. angiosperms	C
12	K	Parthenocarpy is found in A. mango B. orange C. plantain D. brinjal	C
13	U	The fruit in <u>Datura</u> is A. a septicidal capsule B. loculicidal capsule C. porous capsule D. septifragal capsule	D

Q. No.	Obj.	Questions	Answers
14	U	Fruit that develops from hypanthodium inflorescence is termed A. syconium or fig B. sorosis C. samaras D. siliqua	A
FILL IN THE BLANKS			
1	A	Parthenocarpic fruits are necessarily _____.	seedless
2	U	In_____ fruit the seed coat is fused with the pericarp.	Caryopsis
3	K	Fertilised and developed ovary is a _____.	fruit
4	U	Drupes are also called_____ fruits.	stony
5	U	As a general rule, the fleshy fruits are_____.	indehiscent
6	U	Gynoecium with monocarpellary unilocular superior ovary showing marginmal placentation develops into _____ type of fruit.	legume
7	U	The type of multiple fruit in jack fruit is called_____.	sorosis
8	A	The edible part in jack fruit represents the succulent and juicy _____.	perianth
9	U	The whitish structures between the edible flakes in jack fruit are the _____.	tepals
10	U	_____ acts as a stimulus for the development of ovary into fruit.	fertilisation
11	U	_____ fruits burst and discharge their seeds.	dehiscent
13	K	The fruit wall is also called_____.	pericarp

Q. No.	Obj.	Questions		Answers
MATCH THE FOLLOWING				
		A	B	
	U	1. Lomentum	a. Polyaltha	1-e
	U	2. Regma	b. Coconut	2-g
	U	3. Aggregate fruit	c. Schizocarp	3-a
	U	4. Sorosis	d. Lemon	4-h
	U	5. Abutilon	e. Acacia	5-c
	U	6. Pepo	f. Achene	6-i
	U	7. Ficus	g. Ricinus	7-j
	U	8. One seeded indehiscent fruit	h. Jack fruit	8-f
	U	9. Drupe	i. Cucurbita	9-b
	U	10. Hesperidium	j. Syconus	10-d
SHORT ANSWER QUESTIONS				
1	U	What are false fruits ? Ans: If other parts of the flower take part in the development of fruit other than the ovary, it is called false fruit.		
2	U	What are true fruits ? Ans: If only ovary takes part in the development of fruits.		
3	U	Write down the edible parts of apple and coconut. Ans: Apple - Fleshy thalamus Coconut - Endosperm		
4	U	What is parthenocarpy ? Ans: The development of fruit without fertilisation is called parthenocarpy.		

Q. No.	Obj.	Questions Answers
5	U	From which pistil simple fruits are developed ? Ans: Simple fruits are developed from monocarpellary or multicarpellary syncarpous pistil of a single flower.
6	U	What are fleshy fruits ? Ans: If the entire or most of the pericarp is soft and fleshy at maturity, they are fleshy fruits.
7	U	Which fruits are described as dry fruits ? Ans: If the fruits do not contain any fleshy part in the ripe condition, they are called dry fruits.
8	U	What are the types of dry fruits ? Ans: Dry dehiscent and dry indehiscent.
9	U	What are the different kinds of dry indehiscent fruits ? Ans: Achene, Nut, Cypsela, Samara.
10	U	What is caryopsis ? Ans: Caryopsis is a one seeded dry indehiscent fruit ex: Wheat, rice and maize.
11	U	What are dry dehiscent fruits ? Ans: If the pericarp is ruptured after ripening and seeds are liberated - those fruits are called dry dehiscent.
12	U	Define aggregate fruits. Ans: Collection of simple fruits developing from Apocarpous pistil.
13	U	What are multiple fruits ? Ans: Fruit developing from an inflorescence where, all flowers fused together.
14	U	What are follicles ? Ans: A simple dry dehiscent fruit with one carpel, splitting along one suture.

Q. No.	Obj.	Questions	Answers
15	U	Differentiate aggregate fruit from multiple fruit.	Ans: Aggregate fruit develops from multicarpellary apocarpous pistil. Multiple fruit develops from an entire inflorescence.
LONG ANSWER QUESTIONS			
1	K	Give the broad outline classification of fruits.	Ans: 
2	K	What are dry fruits ? How are they classified ?	Ans: 1. In dry fruits, the pericarp or fruit wall becomes dry at maturity. 2. On the basis of dehiscence, dry fruits are classified into three categories. a. Dry dehiscent, b. Dry indehiscent c. Schizocarpic fruits
3	U	Describe the different types of simple fruits in which pericarp is fleshy and succulent ?	Ans: Fleshy fruits are succulent and juicy at maturity. They do not dehisce. The seeds are released only after the decay of pericarp. Simple fruits in which pericarp is fleshy and succulent are Berry, Drupe, Pepo and Pome.
4	U	What is meant by parthenocarpy ? Explain it briefly.	Ans: The development of fruit without fertilisation is called Parthenocarpy. Parthenocarpy is generally seen in ovaries having many ovules. Parthenocarpy is seen in certain varieties of pea, banana, pineapple, tomato and water melon.

Q. No.	Obj.	Questions	Answers
5	A	Describe the different types of dehiscent fruits.	
		Ans: Legume, follicle, capsule Legume - Members of Fabaceae family Follicle - Calotropis Capsule - Loculicidal capsule (Cotton) Septifragal capsule (Datura) Porous capsule (Papaver)	
6	A	There are certain one-seeded dry fruits. What are they ? Describe them.	
		Ans: Caryopsis ex. Oryza, Triticum Achene - ex. Mirabilis (4 O' clock plant) Nut - ex. Cashew nut Cypsela - Helianthus Samara - Dipterocarpus	

UNIT III : TAXONOMY OF ANGIOSPERMS

TOPIC 11 : INTRODUCTION TO TAXONOMY

CONTENT POINTS:

1. Taxonomy is a branch of biology that deals with the identification, nomenclature (naming scientifically and classification of organisms. Taxonomy of plants is also called Systematic Botany.
2. Diversity and need for classification
3. Aims of plant taxonomy -
   (a) Knowing all plants present in the world.
   (b) Diversity and understanding of plants with relation to evolutionary trends.
   (c) Proposing suitable system for the identification of plants
   (d) Arrangement of plants in a system of classification and to understand the relationship.
4. Aspects of taxonomy
   (a) Identification
   (b) Nomenclature
   (c) Classification of units and systems of class (Bentham and Hooker system)

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	Binomial nomenclature indicates (A) family and genus (B) genus and species (C) species and subspecies (D) species and variety	B
2	U	Phylogenetic classification is (A) grouping based on evolutionary trends (B) grouping according to floral similarity (C) grouping based on all morphological features (D) grouping of plants in order of increasing complexity	A

Q. No.	Obj.	Questions	Answers
3	K	Most of the plant names are derived from (A) Latin (B) German (C) English (D) Sanskrit	A
4	K	First Taxonomist who introduced Binomial system (A) J.D. Hooker (B) Eugler (C) Linnaeus (D) Aristotle	C
5	K	Genera plantarem was written by (A) Darwin (B) Bentham and Hooker (C) Linnaeus (D) Theophrastes	B
6	K	Species plantanum was written by (A) Linnaeus (B) Theophrastus (C) Bentham and Hooker (D) Darwin	A

Q. No.	Obj.	Questions	Answers
7	K	Correct sequence of Taxons (A) Order-Class-Family-Genus (B) Class-Order-Family-Genus (C) Family-Class-Order-Genus (D) Order-Family-Class-Genus	B
8	K	Characters from flowers are used as a basis of classification because (A) flowers show variety of colours (B) flowers can be preserved easily (C) reproductive parts are more conservative than vegetative parts (D) None	C
9	K	Basic unit of classification is (A) Species (B) Genus (C) Both genus and species (D) None of the above	A
10	K	Natural system classifies plants on the basis of (A) one or two characters (B) as many as possible characters (C) phylogenetic trends (D) None of the above	B

Q. No.	Obj.	Questions	Answers
11	K	Artificial system classifies plants on the basis of (A) one or two characters (B) as many as possible characters (C) phylogenetic trends (D) None of the above	A
12	K	According to Bentham and Hooker's system of classification, Fabaceae belongs to the following subclass (A) Gamo petalae (B) Polypetalae (C) Monochlamydae (D) None of the above	B
SHORT ANSWER QUESTIONS			
1	U	What are the different aspects of the taxonomy ? Explain them.	
2	U	Explain the three types of systems of classification.	
3	U	Explain binomial system of nomenclature.	
4	K	Describe the merits and demerits of Bentham and Hooker's system of classification.	
5	K	What are the objectives of taxonomy.	
6	K	What are the units of classification. Write them in an ascending order.	

Q. No.	Obj.	Questions	Answers
VERY SHORT ANSWER QUESTIONS			
1	U	Which term is applied to a population of individuals ?	Species
2	K	According to principles of classification whehter actinomorphic flower is primiitive or zygomorphic flower is primitive ?	Actinomorphic
3	U	Which type of fruit is primitive ? Whether simple fruit or multiple fruit?	Simple fruit
4	U	Which type of flower is advanced ? Whether unisexual or bisexual ?	Unisexual
5	U	Which one is primitive according to the principles of taxonomy ?	Superior ovary
6	U	Name of the taxonomysts proposed phylogenetic system of classification.	English Prantil Hutchinson
7	K	Name the three components of taxonomy Ans: Identification, Nomenclature, Classification	
8	K	What are the systems of plant classification ? Ans: Artificial, Natural, Phylogenetic	
9	K	In which book Bentham and Hooker classified the flowering plants ?	Genera Plantarum
10	K	Who proposed the binomial system of nomenclature ?	Linnaeus
11	K	What is the basic unit of classification?	Species
12	K	In which book the binomial system was written ?	Species Plantarum
13	U	In a Botanical name of the plant what does the first word indicate ?	Genus

Q. No.	Obj.	Questions	Answers
14	K	Who wrote the book 'Historia Plantarum'	Theophra-strus
15	U	Expand the abbreviation ICBN ? Ans: International Code of Botanical Nomenclature	
16	K	What is the major anomaly in Bentham and Hooker's system of classification ? Ans: Keeping Gymnosperms in between Dictos and Monocots	
17	K	What is phylogenetic system of classification ? Ans: Based on genetic and evolutionary characters.	
18	K	If classification is based on evolutionary relationships in plants the system of classification is called 1. Artificial system 2. Natural system 3. Phylogenetic system 4. None of these	3
19	U	How can you identify an onion plant without flowers as Monocotyledons ? Ans: Presence of fibrous root system.	
20	K	Which type of classification is based on many morphological characters ?	Natural system
21	U	What is the basic difference between polypetalae and gamopetalae ? Ans: Whether petals are free or united.	
22	U	In the plant classification which character is more useful - Vegetative or floral ?	Floral
23	U	Which term is used to denote any unit of classification regardless of its rank ?	Taxon

Q. No.	Obj.	Questions	Answers
TRUE OR FALSE			
1	U	In the plant classification the floral character is more useful.	True
2	U	In the plant classification vegetatiive characters are more useful.	False
SHORT ANSWER QUESTIONS			
1	K	What are the different aspects of the taxonomy ? Explain them ? Ans: Three aspects - Identification, Nomenclature and Classification Identification: Establishes whether an unknown plant is identical or related to another plant already known or entirely a new plant. Nomenclature: ICBN avoids confusion and makes the scientific name universally acceptable. Classification: Group of any rank i.e. the classification is called taxon - basic unit - species	
2	U	Explain three types of systems of classification ? Ans: Artificial system: Based on one or few superficial characters (Linnaeus) Natural system: Based on many external characters (Bentham and Hooker - Deconddle- De Jussieu) Phylogenetic system: Based on evolutionary relationships of plants (Darwin - "origin of species" - Hutchinson, Tippo, Engler and Prantl)	
3	U	Explain binomial system of nomenclature ? Ans: Earlier names were polynomials - Bauhin and Rivimus used - It was made popularly Linnaeus - Father of binomial nomenclature - First wrote genetic name - and followed by a species name - Linnaeus wrote "Species Plantarum", genus noun - species adjective, Latin -species name is always followed by author's name.	

Q. No.	Obj.	Questions	Answers
4	K	Describe the merits and demerits of Bentham and Hooker's system of classification ?	Ans: Merits - Natural system, Monocots are placed after dicots. Ranals are placed at the base of dicots. Dicots further divided into (a) Thalamiflorae, (b) Disciflorae and (c) Calyciflorae. Gymnospecies are placed in between dicots and monocots. Demerits: Placing of Gymnospecus in between dicots and monocots. Monochlamydae treated as an artificial group. In Gamopetalae, Families with inferior ovary kept earlier - than those with superior ovary.
5	K	What are the objectives of taxonomy ?	Ans: 1. Giving complete knowledge of plants on earth. 2. Explaining the diversity in plants - understanding of evolutionary relationship of plants. 3. Proposing a suitable system for identification of plants. 4. Arranging all kinds of plants in a system of classification showing true relationship. 5. Revealing evolutionary trends - understanding the process of evolution.
6	K	What are the units of classification ? Write them in ascending order.	Ans: ICBN providing a list of units - Unit of classification is known as Taxon. The units of classification: Kingdom->Division-> Subdivision->Class->Subclass->Series->Order->Family-> Genus->Species. Ascending order: Species->Genus->Family->Order-> Seris->Subclass->Class->Subdivision->Division-> Kingdom.
LONG QUESTIONS (ESSAY TYPE)			
1	U	What are the primitive and advanced characters based on evolutionary trends in Taxonomy ?	

TOPIC 12 : FABACEAE AND ASTERACEAE

CONTENT POINTS:

General characters (vegetative and floral characters) of each family.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	Nitrogen fixing nodules are present in A. Malvaceae B. Fabaceae C. Solanaceae D. Asteraceae	B
2	U	Floral formula Br, Brl,%,O,K_5,$C_{1+2+(2)}$, $A_{1+(9)}$, G_1 is typical of the family. A. Asteraceae B. Malvaceae C. Fabaceae D. Caesalpiniaceae	C
3	U	Disc florets is Asteraceae A. Unisexual, zygomorphic, epigynous flowers whose sepals are modified into pappus. B. Unisexual, actinomorphic, epigynous flowers whose sepals are not modified. C. Bisexual, actinomorphic, hypogynous, whose sepals are modified into pappus. D. Bisexual, actinomorphic, epigynous flowers whose sepals are modified into pappus.	D

Q. No.	Obj.	Questions	Answers
4	U	Pentamerous, bisexual, monocarpellary flowers with marginal placentation is found in A. Malvaceae B. Fabaceae C. Asteraceae D. Solanaceae	B
5	K	The botanical name of groundnut is A. Arachis hypogea L. B. Cicer arietinum L. C. Cajanus cajan (L.) Milsp D. Phaseolus mungo Roxb.	A
6	K	The fruit of Dolichos is A. Legume B. Siliqua C. Cypsela D. None of these	A
7	U	Adnation is seen in the family A. Liliaceae B. Fabaceae C. Caesalpiniaceae D. Asteraceae	D
8	K	Inferior ovary is found in the family A. Malvaceae B. Liliaceae C. Asteraceae D. Solanaceae	C

Q. No.	Obj.	Questions	Answers
9	U	Odd petal is located towards posterior side of the flower in the family A. Fabaceae B. Malvaceae C. Asteraceae D. Solanaceae	A
10	U	The inflorescence of Helianthus annus L. consists of A. male florets only B. female and bisexual florets C. bisexual florets only D. female florets only	B
11	A	A weed from Asteraceae family which has become a problem in the recent years in Andhra Pradesh and other states. A. Parthenium hysterophorus B. Chicorium intvbus C. Eclipta alba L. D. Vernonia cinereria	A
FILL IN THE BLANKS			
1	K	Dalbergia belongs to family_____.	Fabaceae
2	K	Food is stored in part_____ of seed in Cajanus cajan L.	Cotyledons
3	K	Papilionaceous corolla is present in the family_____.	Fabaceae
4	K	Boat like petals present on the anterior side of papilionaceous corolla are called as_____.	Keel petrals

Q. No.	Obj.	Questions	Answers
5	U	Monadelphous or diadelphous androecium and monocarpellary ovary are present in the family_____.	Fabaceae
6	U	The bacteria present in the root nodules of Fabaceae is_____.	Rhizobium
7	U	Legume fruit is present in the family _____.	Fabaceae
8	U	Incomplete, irregular, unisexual, ligulate, epigynous and female florets are called_____.	Ray florets
9	A	In the family Asteraceae, the pappus is useful in_____.	fruit dispersal
10	K	In Asteraceae the characteristic fruit is_____.	Cypsela
10	K	Entomophilous pollination with characteristic piston mechanism is present in the family_____.	Fabaceae

VERY SHORT ANSWER QUESTIONS

1 K Papilionaceae is renamed Fabaceae based on one genus. What is it ?

Ans. Faba

2 K In which family do you find geocarpic fruits ?

Ans: Fabaceae

3 K What is the scientific name of groundnut ?

Ans: Arachis hypogea

4 U Which part of leaf is responsible for folding of leaves ?

Ans: Pulvinate leaf base

5 U Which part of leaf performs photosynthesis in Lathyrus ?

Ans: Foliar stipule

Q. No.	Obj.	Questions Answers
6	U	Which part of pulses contain proteins ? Ans: Cotyledons
7	U	Some crops can make soil fertile. To which family they belong ? Ans: Fabaceae
8	K	In which family do you find perigynous flower ? Ans. Fabaceae and Caesolpiniaceae
9	K	Papilionaceous corolla is the characteristic feature of which family ? Ans: Fabaceae
10	K	Write the scientific name of red sanders ? Ans: <u>Pterocarpus santalinus</u>
11	K	Write the floral formula of Fabaceae ? Ans: Br, Brl, %, O, K_5, $C_{1+2+(2)}$, $A_{1+(9)}$, G_1
12	U	Give one example of xerophytic plant of Fabaceae ? Ans: <u>Vlex</u>
13	A	Why Fabaceae crops are preferred for crop rotation ? Ans: Presence of root nodules.
14	U	Name the family which has legume as characteristic fruit ? Ans: Fabaceae and Caesalpiniaceae
15	A	Write the botanical name of the plant from Fabaceae where the fruits are produced below the soil ? Ans: <u>Arachis hypogea</u>
16	U	Which part of cypsela fruit aids in dispersal ? Ans: Persistent pappus-calyx

Q. No.	Obj.	Questions Answers
17	U	If you are given a plant belonging to Asteraceae, viz. only inflorescence, can you assign it to the family ? Ans: Yes, characteristic inflorescence head
18	U	Give the botanical name of the plant of Asteraceae that gives oil seed. Ans: Helianthus or Carthamus
19	K	Write the name of the family studied by you which has inferior ovary. Ans: Asteraceae
20	U	One weed plant from asteraceae is causing skin allergy. Name the scientific name of the plant. Ans: Parthenium hysterophorus
21	U	In which family studied by you do you find syngenesious, epipetalous and hooded anthers ? Ans: Asteraceae
22	U	Write the botanical name of a plant of Asteraceae whose roots are used as an adulterant of coffee powders. Ans: Chichorium intybus
23	U	Which florets lack androecium in heterogamous head ? Ans: Ray floret
24	A	Name the botanical names of two members from Asteraceae which yield aromatic oils. Ans: Tagetus minuta, T. petula
25	A	Which family members have safety mechanism of pollination ? Ans: Asteraceae

Q. No.	Obj.	Questions	Answers
SHORT ANSWER QUESTIONS			
1	U	Explain the floral characters of Fabaceae.	Ans: Raceme inflorescence, perigynous, zygomorphic, gamosepalous, odd sepal anterior - papilionaceous corolla, monoadelphons or diadelphous stamens, monocarpellary, unilocular ovary - marginal placentation - legume fruit.
2	K	Write the economic importance of Fabaceae.	Ans: a. Rich source of proteins - part of our daily diet pulses (Cajanus, Cicer) b. Vegetables - Dolichos, Pisum, Glycine c. Source of oil - Arachis d. condiment - Trigonella e. Timber yielding: Pterocarpus, Dalbergia f. Enriching of the soil - Sesbania, Phaseolus g. Dye yielding - Tudiigo, Butea
3	K	Describe the vegetative characters of Fabaceae.	Ans: Tap root system - Bacterial nodules - Pulvinate leaf base - Simple or compound leaf - Herbs mostly shrubs - (Tephrosia), trees - (Pongamia, Dalbergia), Climbers - Pisum, Lathyrus - twiners - (Dolichos).
4	U	Explain the types of inflorescence in Asteraceae.	Ans: Head or capitulum - Homo or heterogamous head - Peduncle dilates into flat portion - or convex - Head protected by involucre - compound head (Sphaeranthus and Echinops).
5	U	Explain the essential organs in Asteraceae.	Ans: Essential organs - Androecium and Gynoecium Androecium: 5, epipetalous, syngenesious hooded anthers - dithecous Gynoecium: Bicarpellary - syncarpous - unilocular - single ovule - basal placentation - inferior ovary - stigma bifid.
6	K	Describe the disc floret of Asteraceae.	Ans: Bisexual flower - Calyx - papers - corolla - 5, united, tubular - regular. Androecium - 5-syngenesious,hooded anthers - dithecous Gynoecium - Bicarpellary - syncarpous, unilocular Single ovule - basal placentation - inferior ovary

Q. No.	Obj.	Questions Answers
7	S	Describe the Ray floret of Asteraceae. Ans: Unisexual - calyx - pappus, corolla - irregular - united - ligulate - absence of androecium Gynoecium: Bicarpellary - syncarpous - unilocular - single ovule - basal placentation - and inferior ovary
8	A	Explain the economic importance of Asteraceae which are used in daily life for food, medicinal and ornamentals. Ans: Edible oils - Helianthus and Carthamus; Medicinal - Artemesia, Eclipta, edible tubers - Helianthus tuberosus, Chicory obtained from Chichorium intybus Roots - used in coffee, rubber - obtained Solidago. Nuisance weeds - Parthenium skin allergy Ornamental plants - Aster, Chrysanthemum, Zinnia, Dahlia.
LONG ANSWER QUESTIONS		
1	K K	Describe the general characters of Fabaceae. Describe the vegetative and floral characters of family Asteraceae. Ans: Fabaceae: Bacterial nodules on roots - Pulvinate leaf base - Raceme inflorescence - perigynous - zygomorphic - gamosepalous - odd sepal anterior - papilionaceous corolla - Monoadelphous or diadelphous androecium - Monocarpellary, unilocular - marginal placentation - Fruit - legume - economic importance. Asteraceae: Herbs and shrubs - Head inflorescence florets - two types - disc - ray floret, disc floret - bisexual - actinomorphic - Ray floret - unisexual - zygomorphic - Calyx reduced to pappus - persistent - corolla - gamopetalous (tubules) - disc - ligulate (Ray) - stamens epipetalous - syngenesious - hooded anthers - Gynoecium - Bicarpellary - syncarpous - inferior ovary - unilocular - uniovular - basal placentation - fruit cypsela - economic importance.

UNIT IV : PLANT ANATOMY

TOPIC 13 : TISSUES

SUB-TOPIC : MERISTEMATIC AND PERMANENT TISSUES

CONTENT POINTS:

The tissues are nothing but a group cells performing only one function.
In plants the tissues are grouped in different types. Basically all the tissue systems are derived from meristamatic tissues. The meristemsome apical, lateral and intercalary meristems and cambium. Tissues are classified into two major groups: (a) simple tissues and (b) complex tissues, simpler tissues include, parenchyma, sclerenchyma, collenchyma, etc. complex tissue consists xylem and phloem.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The study of internal structural organisation of plants is known as A. Physiology B. Genetics C. Morphology D. Anatomy	D
2	U	The cells of the meristem are A. Isodiametrical B. Isobilateral C. Cuboidal D. Circular	A
3	U	The conducting elements of the phloem are A. Tracheary elements B. Companion cells C. Tracheae D. Sieve elements	D

Q. No.	Obj.	Questions	Answers
4	U	The end walls of the sieve elements are A. flat B. oblique C. transverse D. transverse and oblique	D
5	U	Intercalary meristems help in A. elongation of root B. elongation of node C. elongation of internode D. elongation of stem	C
6	U	Cork cambium is a type of A. lateral meristem B. permanent meristem C. apical meristem D. intercalary meristem	A
7	U	Which one of the following is not a simple tissue ? A. Parenchyma B. Xylem C. Collenchyme D. Sclerenchyma	B
8	U	In which one of the following groups vessels are found in the xylem. A. Angiosperms B. Pteridophytes C. Gymnosperms D. None of the above	A

Q. No.	Obj.	Questions	Answers
9	U	In which one of the following sclereids are found. A. Fruit of apple B. Fruit of pear C. Fruit of pea D. Fruit of citrus	B
10	U	Sclerenchyma cells are characterised by A. cellulose cell wall B. lignified primary wall C. hard rigid secondary walls D. uneven thickness of cell wall	C
FILL IN THE BLANKS			
1	U	The two kinds of tissues in angiosperms are_____ and_____ tissues.	permanent meristematic
2	K	_____ growth results in increase in thickness.	Secondary
3	K	If cambium present, in the vascular bundle is known as_____.	open
4	K	The first formed xylem elements of the primary xylem are called_____.	Protoxylem
5	K	Phloem fibres are known as_____.	bast fibres
6	U	Aerenchyma gives_____ to aquatic plants.	buoyancy
7	U	The two types of pits seen in tracheids are_____ and_____.	simple bordered
8	U	Tracheids establish communications with adjacent tracheids through the_____.	pits
9	K	A_____ tissue is made up of more than one type of cell.	Complex

Q. No.	Obj.	Questions	Answers
10	U	Unlike the vessel elements the tracheids are_____ cells.	imperforate

MATCH THE FOLLOWING

		A	B	
	U	1. Vascular cambium	a. Hydrophytes	1-d
	U	2. Xylem	b. Supporting cells	2-e
	U	3. Aerenchyma	c. Perforate	3-a
	U	4. Sclerenchyma	d. Lateral meristem	4-b
	U	5. Vessels	e. Complex tissue	5-c

SHORT ANSWER QUESTIONS

1	A	What are best fibres ? Mention its commercial importance ? Ans: 1. Sclerenchyma cells that occur in phloem are best fibres. 2. They are useful in the manufacture of ropes and cords.
2	U	Distinguish fibres from sclereids. Ans: Fibres are very long, narrow, with pointed ends. They occur in the form of strands. Sclereids are isodiametric or irregular and have very narrow cell cavity showing lamellations.
3	U	What are the two main types of complex tissues ? Mention the function of those tissues. Ans: Xylem and Phloem Xylem - Water conducting tissue Phloem - Food conducting tissue
4	K	Define a tissue. Ans: Tissues are group of cells which are ditinct from others in structure or function or both.

Q. No.	Obj.	Questions	Answers
5	J	What is the basis for the classification of meristems and mention what are the types of meristems ? Ans: On the basis of location in the plant body meristems are classified. The three types of meristems are - apical, intercalary and lateral meristems.	
6	U	What are stone cells ? Where are the stone cells present ? Ans: Sclereids are the stone cells. They occur in epidermis of the peal and in parenchymatous tissue of the pear fruit and vascular tissues.	
7	K	Mention the functions of parenchyma chlorenchyma and aerenchyma. Ans: Parenchyma - Storage Chlorenchyma - Photosynthesis Aerenchyma - Gives buoyancy	
8	U	What are lateral meristems ? Mention the functions of lateral meristems ? Ans: They occur laterally along the sides of stem and root. Function: They give rise to secondary permanent tissues responsible for the growth in thickness or girth of the stem and root.	
9	S	Draw the lateral section and cross section of phloem and label the parts. Ans:	

Q. No.	Obj.	Questions Answers
10	U	What is the important feature of sieve tube elements ? Ans: The sieve tube elements contain a lining layer of cytoplasm but no nucleus.
LONG ANSWER QUESTIONS		
1	U	What are meristematic tissues ? Write about the types of meristematic tissues and their functions. Ans: Meristematic tissues are perpetually young tissues whose cells are concerned with formation of new cells. The three kinds of meristematic tissue are: apical meristem, intercalary and lateral. Functions: Apical - Roots and stem increase in length Intercalary - help in the elongation of the internodes Lateral - Responsible for the growth in thickness or girth of the stem and root.
2	U	Explain simple tissues and write the functions of those tissues. Ans: Simple tissue is one of the permanent tissues. It is made up of only one type of cell. Ex: Parenchyma, Collenchyma and Sclerenchyma Functions: Parenchyma - Storage Collenchyma - Gives strength to the young organs Sclerenchyma - They give strength and rigidity to the plant body
3	U	What are the various types of secondary wall thickening of tracheids and explain those thickenings. Ans: The secondary wall thickening may be a. annular (in the form of rings) b. spiral (in the form of helix) c. scalariform (ladder like) d. reticulate (net-like) and e. pilted
4	K	What is phloem ? What is the function of phloem ? Why is phloem called heterogenous tissue ? Ans: Phloem is one of the complex tissues. It helps in the conduction of food. It is heterogenous because it is composed of different kinds of cells. (a) Sieve elements, (b) companian cells and (c) phloem parenchyma and phloem fibres

Q. No.	Obj.	Questions Answers
5	U	Describe the different types of simple tissues. Ans: Parenchyma, collenchyma and sclerenchyma 1. Structure 2. Location 3. Function 4. Diagrams
6	S	Draw the various types of secondary wall thickening of tracheids. Ans: Diagrams showing 1. Annular 2. Spiral 3. Scalariform 4. Reticulate 5. Pilted
7	S	Draw the lateral section of shoot showing the position of meristem. Ans: Diagram showing the lateral section of shoot - showing the position of meristems. Apical, intercalary and lateral meristems - functions.
8	U	Write a brief account about phloem. Ans: 1. Sieve elements 2. Companion cells 3. Phloem parenchyma 4. Phloem fibres

TOPIC 14 : ANATOMY OF STEM, ROOT AND LEAF

CONTENT POINTS:

Plants are made of organs. There are only three fundamental organs - stem, root and leaves. All these organs are made up of tissue systems. Tissues are mainly two types, simple and complex.
1. In stem vascularature is endarch
2. In root vascularature is exarch
3. In leaf it is diarch and mesearch

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	The vascular bundles in Dicot stems are	C
		A. closed and collateral	
		B. open and radial	
		C. open and collateral	
		D. closed, radial and collateral	
2	U	The cortex of bean root is with	A
		A. homogenous mass of parenchyma cells	
		B. parenchyma and collenchyma cells	
		C. parenchyma and starch layers	
		D. parenchyma endodermis and pericycle	
3	U	Find out the wrong pair.	C
		A. Endodermis-Casparian strip	
		B. Epidermis-Stomata	
		C. Pericycle-Passage cell	
		D. Leaf-Mesophyll	

Q. No.	Obj.	Questions	Answers
4	U	Among the following characters which is more specific to monocot roots ? A. Polyarch xylem B. Rhizodermis with root hairs C. Radial vascular bundles D. Closed vascular bundles	A
5	K	The pith is otherwise called A. Epiblema B. Medulla C. Starch grain D. Parenchyma	B
6	K	The root hairs are A. unicellular B. dead cells C. multicellular D. unicellular or sometimes multicellular	A
7	U	Which is the major function of the periderm in plants that undergo secondary growth ? A. Water conduction B. Starch formation C. Storage D. Protection and wound healing	D

Q. No.	Obj.	Questions	Answers
8	K	The vascular bundles are scattered, closed and collateral in A. dicot stem B. monocot stem C. dicot leaf D. dicot root	B
9	U	The anatomy of dicot leaf is unique in having A. palisade parenchyma on the adaxial side and spongy parenchyma on the abaxial side. B. no differentiation of palisade and spongy parenchyma cells. C. spongy parenchyma on the adaxial side and palisade parenchyma on the abaxial side. D. epidermis with stomata.	A
10	U	In this aspect the internal structure of a leaf is closely related to that of root. A. Collateral vascular bundle B. Collateral and closed vascular bundle C. Closed vascular bundle D. None of these	C
11	U	The tissue of stem which separates xylem from phloem is called A. Cork cambium B. Fascicular cambium C. Procambium D. Interfascicular cambium	B

Q. No.	Obj.	Questions	Answers
12	U	How often are casparian strips found in dicot stems ? A. Very often B. Never C. Sometimes D. Always	A
FILL IN THE BLANKS			
1	K	The lateral roots originate from the _____.	pericycle
2	U	The vascular bundle with the protoxylem facing the centre of the stem is described as_____.	endarch
3	K	_____ are extensions of the epidermal cells.	Root hairs
4	K	The guard cells are_____ shaped.	bean
5	U	A layer of parenchyma cells surrounding each vein in leaves is called_____.	border parenchyma/ bundle sheath
6	U	The mesophyll of leaf is with_____ and_____ parenchyma cells.	palisade, spongy
7	K	The xylem is otherwiise called_____.	wood
8	A	The_____ layer found in sunflower stem is morphologically homologous to the endodermis found in the roots.	starch
9	U	The protoxylem lacuna is found in _____ stem.	maize
10	K	The function of the pith is_____.	storage

Q. No.	Obj.	Questions		Answers
MATCH THE		FOLLOWING		
		A	B	
	K	1. Sunflower stem	a. Photosynthesis	1-c
		2. Maize stem	b. Cork	2-d
	A	3. Palisade parenchyma	c. Bundle cap	3-a
	U	4. Primary plant body	d. Bundle sheath	4-e
	U	5. Periderm	e. Apical meristem	5-b

SHORT ANSWERS

1 U Why is the vascular bundle of dicot stem called open ?

Ans: In dicot stems in between the xylem and the phloem a strip of lateral meristem called cambium is present. That is why the vascular bundle is called open.

2 K Define a collateral vascular bundle.

Ans: Xylem and phloem are arranged side by side on the same radius as in stem and leaf. Such vascular bundles are called collateral.

3 K What is fascicular cambium ?

Ans: The cambium of the vascular bundle is present within the bundles as in dicot stems called fascicular cambium.

4 U Point out the anatomical differences between dicot and monocot roots.

Ans: 1. In dicot roots the xylem is usually tetrarch, diarch or triarch but in monocot roots the xylem is polyarch.

2. Pith is usually absent in dicot roots but prominent pith occurs in monocot roots.

Q. No.	Obj.	Questions Answers
5	U	What is an isobilateral leaf ? Ans: The mesophyll of monocot leaf is not differentiated into palisade and spongy parenchyma cells. Such a leaf is called isobilateral.
6	K	Mention the parenchyma cell layers found in the mesophyll of a dicot leaf. Ans: 1. Palisade parenchyma 2. Spongy parenchyma
7	U	What are passage cells ? Ans: In roots the cells opposite to the protoxylem vessels have no casparian thickenings. Such endodermal cells are called passage cells.
8	K	Define a radial vascular bundle. Ans: The xylem and phloem of the root are arranged in alternate radii as separate patches, they are separated by parenchyma cells. This arrangement of vascular tissue is called radial vascular bundle.
9	K	What are lenticels ? Ans: 1. The lenticels are lens shaped pores in the stem which have undergone secondary growth. 2. The lenticels help in exchange of gases.
10	U	Name the zones found in the cortex of sunflower stem. Ans: 1. Collechyma zone 2. Chlorenchyma zone 3. Parenchyma zone
LONG ANSWER QUESTIONS		
1	K	Describe the vascular system of a dicot stem. Ans: 1. Collateral vascular bundle - xylem and phloem are arranged side by side on the same radius. 2. The vascular bundle is open, with cambium inbetween xylem and phloem called fascicular. 3. The primary phloem lies towards the periphery and protophloem and metaphloem are found in it. 4. The protoxylem occurs towards the centre of the stem. So the xylem is endarch. 5. The large central portion of the stem is called pith. The pith radiates through the regions between the vascular bundles and forms the primary medullary rays.

Q. No.	Obj.	Questions Answers
2	U	List out the anatomical differences between the dicot and monocot stems. Ans: 1. In dicot stem the hypodermis is collenchymatous whereas it is sclerenchymatous in monocot stem. 2. Ground tissue is differentiated into cortex, medullary ray and pith in dicot stem, but in monocot stem the cortex is without differentiation. 3. The pith is present in dicot stem but it is not marked out in monocot stem. 4. The vascular bundle is open in dicot stem but it is closed in monocot stem. 5. The vascular bundles are arranged in a ring in dicot stem, but the bundles are scattered in monocot stem.
3	U	Explain the primary anatomy of a monocot root. Ans: 1. Rhizodermis is the outermost layer of living cells, without cuticle and stomata, but root hairs are present. 2. The cortex lies internal to the rhizodermis with many layers of living parenchyma cells. 3. An endodermis with casparian strips is present. 4. The outer most layer of the stele is the pericycle. 5. The vascular bundle is radial, polyarch and exarch. 6. The central portion is occupied by a large pith.
4	U	Write short notes on the vascular bundles found in maize stem. Ans: 1. The number of vascular bundles are many not uniform in size and they are scattered. 2. The vascular bundles are collateral. 3. The vascular bundles are without cambium and are called closed. 4. Each vascular bundle is surrounded by a sheath of sclerenchyma which constitutes the bundle sheath. 5. The vessels are arranged in the form of the letter 'r'. Protoxylem lacuna is formed by the disintegration of protoxylem.

Q. No.	Obj.	Questions	Answers
5		Draw and label the anatomy of a dicot leaf. Ans:	

UNIT V : CELL BIOLOGY

TOPIC 15 : ULTRA STRUCTURE OF PLANT CELL AND CELL DIVISION

CONTENT POINTS:

Plants begin their existence as a single cells. They divide and forms cells. The cell undergoes mitosis equational division and meiosis cell has ER, Gogli complex, Chloroplasts, Mitochondria, Lysosomes, Nucleus, etc.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	Robert Hooke	B
		A. lived in seventeenth century	
		B. discovered cork cells	
		C. invented the lens	
		D. constructed the microscope	
2	K	Who proposed cell theory ?	C
		A. Watson and Crick	
		B. Darwin and Wallace	
		C. Scheleiden and Schwann	
		D. Mendel and Morgan	
3	K	The term protoplasm was first used by	B
		A. Darwin	
		B. Purkinjee	
		C. John Ray	
		D. Hutchinson	
4	K	Which one of the following is a prokaryote ?	B
		A. Agaricus	
		B. Nostoc	
		C. Oedogonium	
		D. Chara	

Q. No.	Obj.	Questions	Answers
5	U	A plant cell usually differs from an animal cell in the absence of A. ribosome B. centriole and cell wall C. mitochondria D. endoplasmic reticulum	B
6	K	Which is called as the suicidal bag ? A. Centrosome B. Lysosome C. Microsome D. Mesosome	B
7	K	The study related to the structure and function of cells is A. Palynology B. Karyology C. Cytology D. Embryology	C
8	K	Golgi complex is situated A. nearer to cell membrane B. around mitochondria C. closer to nucleus D. closer to chloroplast	C
9	K	Tomato fruit is red due to A. Chlorophyll B. Carotene C. Xanthophyll D. Anthocyanin	B

Q. No.	Obj.	Questions	Answers
10	U	Which of the following molecules moves regularly from nucleus to cytoplasm ? A. Glycogen B. RNA C. DNA D. All the above	B
11	K	Amitosis is the usual process of cell division in A. eukaryotic cells B. prokaryotic cells C. spore mother cells D. meristematic cells	B
12	K	Mitosis actually means A. reduction in chromosome number B. division of nucleus only C. division of cytoplasm only D. both nuclear and cytoplasmic inequal division	D
13	U	Chromosome number is maintained constant because of A. independent assortment B. crossing over C. duplication D. synapsis	A

Q. No.	Obj.	Questions	Answers
14	U	Mitosis occurs in A. pollengrains B. vegetative cells C. embryo D. ovule	B
15	U	Phragmoplast is related to A. division of nucleolus B. cell elongation C. cytokinesis D. assemblage of chromosomes at metaphase	C
16	K	Homologous chromosomes are A. different in structure B. from same parent C. from pairs in mitosis D. similar in shape and structure with pairing affinity	D
17	K	Chromosomes are made up of A. DNA B. RNA C. proteins D. DNA, RNA and proteins	D
18	K	Centromere is concerned with A. movement of chromosomes to poles B. duplication of DNA C. splitting of chromosomes D. formation of spindle fibres	A

Q. No.	Obj.	Questions	Answers
19	K	The most important genetic material is A. DNA B. RNA C. proteins D. all the above	A
20	U	Haploid condition is the dominant phase in A. algae B. fungi C. bryophyta D. all the above	D
FILL IN THE BLANKS			
1	K	Ribosomes are called_____.	Protein factories
2	K	The shape of vesicle units are_____.	Spherical
3	K	If ribosomes are attached to the outer surface of ER they are called_____.	RER (Rough Endoplasmic Reticulum)
4	K	_____ provides enzymes for intra-cellular digestion.	Lysosomes
5	K	The folds seen in mitochondria are called_____.	Cristae
6	K	Thylakoids of one granum are connected to another by tubular connections _____.	Stroma lamellae
7	K	_____ are the colourless plastids.	Leucoplasts
8	K	Yellow, red and orange colour of many flowers and fruits are due to_____.	Chromoplasts
9	K	A vacuole is surrounded by a membrane called_____.	Tonoplast

Q. No.	Obj.	Questions	Answers
10	K	Chromosomes are described as_____.	Vehicles of heredity
MATCH THE		FOLLOWING	
		A B	
	K	1. Purkinje a. Used the term cell	1-c
	K	2. Schleiden and Schwann b. Power houses of the cell	2-e
	K	3. Robert Hooke c. Protoplasm theory	3-a
	K	4. Mitochondria d. Protein synthesis	4-b
	K	5. Ribosomes e. Cell theory	5-d
VERY SHORT ANSWER QUESTIONS			
1	K/U	Name the branch of biology that deals wiith the study of cell and its components ? Ans: Cell Biology or Cytology	
2	K	What did Leeuwenhock observe first through a microscope? Ans: He first observed bacteria, protozoa and other micro organisms.	
3	K	Who proposed that cell is the unit of life ? Ans: Schleiden and Schwann	
4	K	Who stated that cells arise from pre-existing cells ? Ans: Virchow	
5	U	Name the organisms which is the connecting link between non-living and living organisms. Ans: Viruses	

Q. No.	Obj.	Questions Answers
6	A	Name the genetic material in plant viruses ? Ans: RNA
7	U	What is the physical basis of life ? Ans: Protoplasm
8	U	Which is the intracellular layer that connects the neighoburing cells ? Ans: Middle lamella
9	A	Name the plants that lack chloroplasts ? Ans: Bacteria, fungi
10	A	A plastid stores starch, under which type of plastid it is classified ? Ans: Leucoplast
11	K	Name the pigmetns that, imparts colour to flowers. Ans: Carotenes, Xanthophylls
12	K	Which are called as the power house of the cell ? Ans: Mitochondria
13	K	Define units of heredity ? Ans: Genes are the units of heredity. They carry genetic material/expression from generation to generation without change.
14	K	Which cell organelle takes part in the cell plate formation during cell division ? Ans: Golgi complex
15	K	A fruit is orange-red in colour. Name the pigment responsible for it. Ans: Carotene

Q. No.	Obj.	Questions Answers
16	A	If the stem tuber is exposed to light what will happen to leucoplasts ? Ans: Leucoplasts change into chloroplasts.
17	A	A cell lacks ribosomes. Name the metabolic process which cannot be carried out by the cell. Ans: Protein synthesis
18	U	Bacteria carry out respiration.They lack mitochondria. Where are the respiratory enzymes located ? Ans: In plasma membrane
19	K	A cell lacks ER, mitochondria, golgi complex, plastids. In which category you would place the cell ? Ans: Prokaryotic cell
20	K	Name the organelle which is involved in secretion. Ans: Golgi complex
21	U	The life of a algae begins with a single diploid cell what is it ? Ans: Zygote
22	K	How unicellular organisms like chlamydomonas grow ? Ans: By cell enlargement
23	U	Name the type of cell division in which daughter cells resemble parent cells. Ans: Mitosis
24	K	The nucleus divides two daughter nuclei are formed by constriction. Name the type of division. Ans: Amitosis
25	K	Name the stage of cell division in which nucleus is very active and prepares for division. Ans: Interphase

Q. No.	Obj.	Questions Answers
26	K	Name the stage of mitosis in which chromosomes are arranged on equatorial plate of the spindle. Ans: Metaphase
27	U	In which stage of mitosis, the centromere of each chromosome divided ? Ans: Anaphase
28	K	Name the stage of mitosis which is the last phase of cell division. Ans: Telophase
29	U	What term is applied for homologous pair of chromosomes ? Ans: Bivalent
30	K	Name the process in which homologous chromosomes are paired. Ans: Synapsis
31	U	Name the term applied for exchange of chromosomal segments between non-sister chromatids of a tetrad. Ans: Crossing over
32	U	How many daughter nuclei are formed at the end of meiosis ? Ans: Four
33	U	What is the significance of crossing over ? Ans: The appearance of new characters in offsprings is the results of crossing over.
34	A	The somatic cells of maize shows 20 chromosomes. What would be the number of chromosomes in the pollen grains in maize. Ans: Ten

Q. No.	Obj.	Questions Answers
35	A	If crossing over does not occur during pachynema of meiosis. What type of characters appear in progeny ? Ans: Parental characters
SHORT ANSWER QUESTIONS		
1	K	What is tonoplast ? Ans: The vacuole of the cell is surrounded by a membrane called tonoplast.
2	K	Define cell biology. Ans: The branch of biology which deals with the study of structure and functions of the cell is called cell biology.
3	U	Write a short note on lysosomes. Ans: Lysosomes are tiny, spherical organelles. They are bound by a single membrane with digestive enzyme, hydrolases. These enzymes are released in dead or damaged cells to digest them.
4	U	What are thylakods ? Ans: In the stroma of the chloroplast a number of membrane bound, tubular structures run throughout the length. These are called stroma lamellae or thylakoids
5	U	What is the significance of crossing over ? Ans: 1. Crossing over leads to the production of new combination of genes. 2. It plays an important role in the process of evolution.
6	K	Define cytokinesis. Ans: The division of the cytoplasm is called cytokinesis.
7	K	Define karyokinesis. Ans: The division of the nucleus is called Karyokinesis.

Q. No.	Obj.	Questions	Answers
8	K	What is interphase ? Ans: The interval between two successive divisions is called interphase.	
9	K	What is centromere ? Ans: The chromatids of the chromosome are held together by the centromere. The centromere may split during cell division.	
10	U	What happens to the centromere during anaphase of mitosis and anaphase I of meiosis ? Ans: The centromere divides at the anaphse and move to the opposite pole during mitosis whereas during prophase I of meiosis. The centromere does not divide and thus the entire chromosome move to the opposite poles.	
11	U	Which organelles are involved in secretory function of a cell ? Mention their structural components. Ans: Golgi complex. Their structural components are a. Cisternae b. tubules c. vesicles	
12	U	Differentiate rough ER from smooth ER. Ans: Rough surfaced ER has ribosomes on membranes. Smooth ER lack ribosomes.	
13	U	Why ribosomes are called "protein factories" ? Ans: Ribosomes play a significant role during the biosynthesis of proteins so they are called protein factories or 'engines of the cell'.	
14	K	What are Sat chromosomes ? Ans: Sometimes the chromosomes show a round knob like or spherical button like appendages at one end connected to the rest of the chromosome by a small filament. Chromosomes with such portions are called Sat chromosomes or satellite chromosomes.	

Q. No.	Obj.	Questions Answers
15	U	What is the significance of nucleolus ? Ans: Round or oval acidophilic body found embedded in the matrix of the nucleus. It contains large amount of RNA. Its chief function is synthesis of r-RNA.
LONG ANSWER QUESTIONS		
1	U	Describe the ultrastructure of a plant cell (a typical eukaryotic cell). Ans: a. Cell wall is the characteristic feature of the plant cell, it gives a distinct shape and rigidity to the cell. b. The plasma membrane, which is made up of two layers of phospholipids is surrounded by the cell wall. c. The translucent and jelly like protoplasm is present inside the cell. d. The membrane bound organelles like nucleus, mitochondria, chloroplast endoplasmic reticulum, dictyosomes, lysosomes are found in the cytoplasm. e. One or more spherical or oval structures called vacuoles occur in the cytoplasm.
2	U	List any five differences between plant and animal cells. Ans: a. Cellulose cell wall is present in plant cells but cell wall is absent in animal cells. b. Plant cell has distinct shape but the shape of the animal cell is not so definite. c. Plant cell contains plastids like chloroplast but plastids are absent in animal cells. d. Plant cells are larger than animal cells. e. Mostly starch is the storage product in plant cells but glycogen is the storage product in animal cells.

Q. No.	Obj.	Questions Answers
3	U	Describe the chemical composition of cell wall. Ans: a. Middle lamella which binds the two adjacent cells is made up of calcium and magnesium pectate. b. Primary wall is composed of cellulose microfibrils. The space between the microfibrils is impregnated with a matrix of hemicellulose and pectin. c. Secondary wall: The secondary wall is usually three layered, the microfibrils are laid one after the other in parallel fashion. The microcapillary spaces between the microfibrils are impregnated with lignin, suberin, hemicellulose.
4	U	Explain the ultrastructure of the chloroplast and draw a labelled diagram. Ans: a. Each chloroplast is surrounded by an envelope made up of double membranes. b. The space enclosed by the envelope is filled with matrix called stroma. c. A number of membrane bound, tubular structures rrun throughout the length of the stroma called stroma lamellae or thylakoids. d. At certain places the stroma lamellae become disc like and are placed one above the other like a stack of coins to form grana or granalamellae. e. The stroma also contaiins a small circular double helical DNA ribosomes (705) and enzymes.
5	U	What are the chemical substances found in the chloroplast ? Ans: a. Chloroplast is rich in proteins and lipids. b. It contains phospholipids which constitute their membrane. c. Chlorophyll is the major pigment in the chloroplast, other pigments like caroteins and xanthophylls are also present. d. Chloroplasts contains some cytochromes, vitamins K and E and elements such as copper, iron, magnesium and manganese. e. Magnesium is an important constituent of the chlorophyll molecule like the iron in the haemoglobin of blood.

Q. No.	Obj.	Questions Answers
6	U	List out the significance of mitosis. Ans: a. The chromosomes which carry hereditary information is transfer unchanged information from one generation to another. b. Due to mitosis, one cell divides into two daughter cells. c. The number of chromosomes in each daughter cell is equal to the number of chromosomes in mother cell. d. It helps in the organisms in asexual reproduction. e. Mitosis helps in the regeneration of damaged or lost tissues and healing of wounds.
7	U	What are the sequence of events that the chromosomes undergo during prophase I of meiosis ? Ans: a. Leptotene: The chromatin fibres condense and coil to become visible as long stender thread like structures towards the end of leptotene each chromosome can be seen to consist of two chromatids. b. Zygotene: Homologous chromosomes come together and lie side by side throughout their length. This is called synapsis. The paired chromosomes are now called bivalent. c. Pachytene: The chromosomes condense further and become shorter and thicker. They are very distinct now. The bivalent becomes a tetrad with four chromatids. d. Diplotene: The homologous chromosomes condense further. They begin to separate from each other except at the chiasmata. e. Diakinesis: The separation of chromosomes becomes complete due to terminalisation. The nucleolus and nuclear membrane disappear and spindle formation starts.

UNIT VI : PLANT ECOLOGY

TOPIC 16 : ECOLOGY AND ITS RELATION TO ABIOTIC AND BIOTIC COMPONENTS OF THE ECOSYSTEM

CONTENT POINTS:

1. Ecology is divided into two major divisions,viz.(a) autecology and (b) synecology. It deals with species and its related abiotic and biotic environments, together known as ecosystem.
2. Definition, Historical aspects, Branches of ecology
3. Ecosystem - components - abiotic components - biotic components - trophic levels - food chain - ecological pyramid
4. Kinds of ecosystems - Natural and Artificial
5. Study of one ecosystem - as an ideal example - pond ecosystem

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The top consumers in the food chain of grass land ecosystem are A) Herbivores B) Carnivores C) Bacteria D) Producers	B
2	K	Benthos are A) Phytoplankton B) Zooplankton C) Animals attached to green plants D) Animals present at the bottom of the pond	C
3	K	The ecological pyramid of numbers in a pond ecosystem is A) upright B) inverted C) twisted D) none of the above	A

Q. No.	Obj.	Questions	Answers
4	K	In an ecosystem A) number of producers is more than that of primary consumers B) number of primary consumers is more than that of producers C) number of secondary consumers is more D) primary consumers do not completely depend on producers	A
5	U	Lotic ecosystem operates in A) stagnant water B) estuary C) running water D) ocean	C
6	K	Which is the main trappers of solar energy in an ecosystem A) A consumer organism in food chain B) Green plants at producer trophic level C) Carnivores D) Herbivores	B
7	U	If all green plants on the earth are destroyed A) only pests shall die B) only herbivores shall die C) all animals shall die ultimately D) nothing shall happen to animals	C

Q. No.	Obj.	Questions	Answers
8	U/A	A peacock eats snakes, a snake eats insects thriving on green plants, what do you call the peacock in this food chain A) Primary consumer B) Secondary consumer C) Tertiary consumer D) None	C
9	K	A pond is A) A biome B) A natural ecosystem C) An artificial ecosystem D) A community of plants and animals only	B
10	K	The basic source of energy in an ecosystem is A) sun light B) glucose C) proteins D) ATP	A
11	K	All the living organisms of the earth constitute A) biosphere B) community C) biome D) association	A

Q. No.	Obj.	Questions	Answers
12	K	Which of the following functions performed by a forest help in controlling drought ? A) Forests prevent soil erosion B) Forests act as water sheds C) Forests have lot of water plants D) Forests bring rain fall	D
13	U/A	The following is logical sequence in carbon cycle A) producer-consumer-decomposer B) decomposer-consumer-producer C) producers-decomposer-consumer D) consumer-producer-decomposer	A
14	K	Biological equilibrium is equilibrium among the A) producers B) producers and consumers C) decomposers and producers D) producers, consumers and decomposers	D
15	K	Biotic factors are A) chemical factors of soil which affect life B) physical factors of soil which affect life C) all living organisms which influence other organisms D) Factors of atmosphere which affect life	C

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	K	The giant ecosystem present on the earth_____	Biosphere
2	K	Trophic levels represent the_____ in an ecosystem.	food levels
3	U	In an ecosystem the amount of energy _____ when it flows from one trophic level to another trophic level.	consumed
4	U	The first position in the food chain is occupied by_____	producers
5	U	The second position in the food chain is occupied by_____	primary consumers
6	U	World environment day is celebrated on _____ every year.	June 5th
7	U/C	Decomposers act as_____ of the ecosystem.	Scavengers
8	K	Benthic organisms of a pond are also called_____	detrivores
9	K/U	Aquarium is an example of a small _____ ecosystem.	artificial

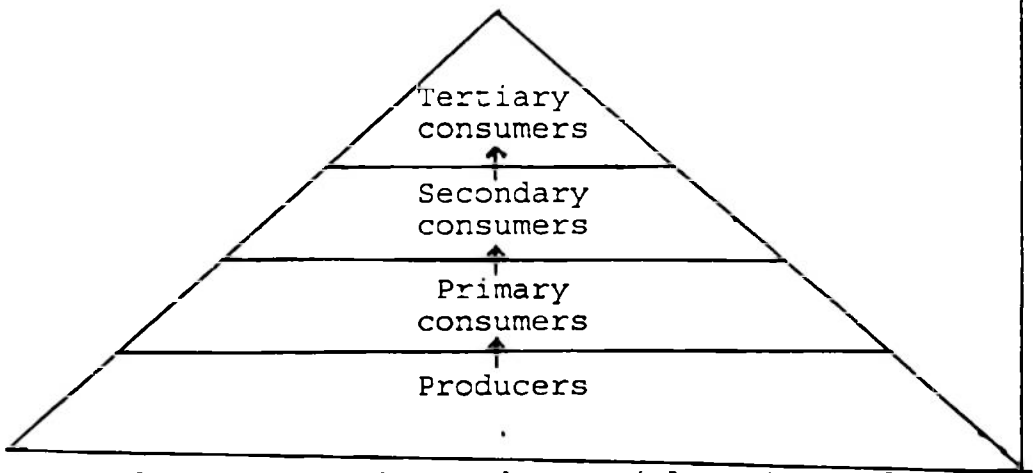
SHORT ANSWER TYPE QUESTIONS

1 K/U Enumerate different kinds of ecosystems?

Ans: There are two types: (a) Natural and (b) Artificial

Natural ecosystem can be divided into two
(1) Terrestrial ecosystem
(2) Aquatic ecosystem

1. Terrestrial ecosystem
The natural ecosystem that operates on land is called the terrestrial ecosystem.
It is further divided into
(a) Forest ecosystem
(b) Grassland ecosystem
(c) Desert ecosystem

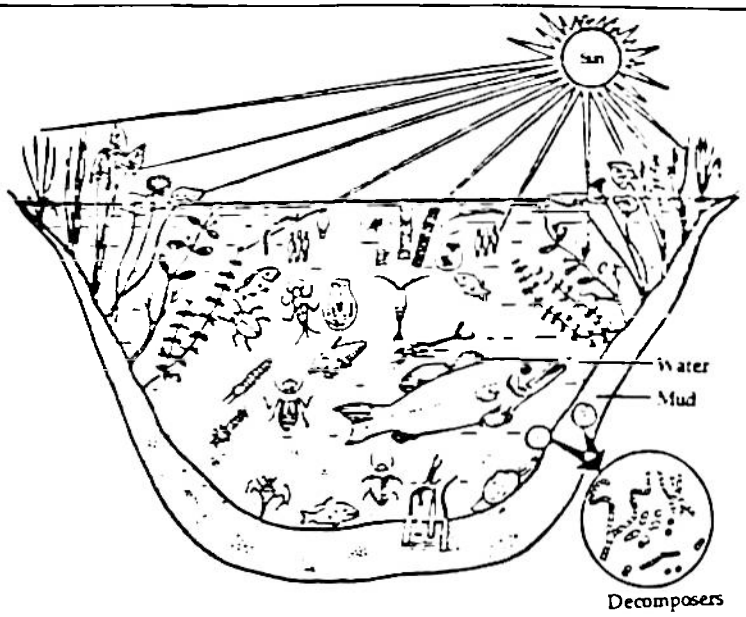
Q. No.	Obj.	Questions	Answers
		2. Aquatic ecosystem: The ecosystem that operates in water is called aquatic ecosystem. It is of two types: (a) Fresh water ecosystem (fresh water) (b) Marine ecosystem (sea water) Fresh water ecosytem: The aquatic ecosystem that operates in fresh water is called the fresh water ecosystem. (a) Ecosystem in stagnant fresh water like lakes and ponds is lentic ecosystem. (b) Ecosystem in running water like streams and rivers is lotic ecosystem. Marine ecosystem: The aquatic system that operates in salt waters is called marine ecosystem. eg: Vegetation and animals in sea Artificial ecosystem: In addition to natural ecosystem, man engineers artificial ecosystems. eg: Crop land ecosystem, fish pond ecosystem.	
2	U	What is an ecological pyramid ? Explain an ecological pyramid in a pond ecosystem ? Ans: The relationship between various trophic levels of a food chain can be expressed by means of graphic diagrams called the ecological pyramids.  In a pond ecosystem the producers (plants) are large in number. The primary consumers (smaller fish, rotifers are less in number. The secondary consumers (water betel, larger fish) are still lesser in number. The tertiary consumers (king fishes, sharks are few in number).	

Q. No.	Obj.	Questions	Answers
VERY SHORT ANSWERS			
1	K	Which apparatus will be used in calculating the biomass of macrophytes ?	Ans: Oxygen bomb calorimeter
2	K	Why the water in a pond generally looks green in colour in winter ?	Ans: Due to vigorous growth of phytoplankton
3	U	What is an ecological pyramid ?	Ans: The graphic representation of various trophic levels in an ecosystem is called ecological pyramid.
4	U	What do you call the transfer of food energy from producers through a series of organisms in an ecosystem ?	Ans: Food chain, food web
5	U/K	What is synecology ?	Ans: Study of plant communities in relation to environment.
6	U/K	What is autecology ?	Ans: Study of individual species in relation to environment
7	K	Define ecosystem ?	Ans: Ecosystem may be defined as the interaction between biotic and abiotic components of nature.
8	K	Name the organisms which are attached to the bottom of the pond.	Ans: Benthos or Detrivores
9	K	Mention any artificial ecosystem.	Ans: Aquarium, crop fields
10	K	Name the amphibian macrophytes ?	Ans: Ipomoea, Polygonum, Marsilea, Typha, etc.

Q. No.	Obj.	Questions Answers
11	K	What type of ecosystem is formed near river mouths ? Ans: Estuarine ecosystem
12	K	What is biosphere ? Ans: The part of the earth and its atmosphere (land, sea, air) inhabited by living organisms.
13	K/U	What is lentic ecosystem ? Ans: A fresh water ecosystem in which water is stagnant. Eg: Pond
14	K/U	What is lotic ecosystem ? Ans: A fresh water ecosystem in which water flow is continuous. Eg: River
LONG ANSWER QUESTIONS		
1	K	What is meant by ecology ? Explain briefly the various branches of ecology ? Ans: Ecology is a branch of biology that deals with the study of living organisms and their interaction with the environment. Ecology is a combination of two great words - Oikos = house or dwelling place logos = the study - denotes the relationships between the organisms and their environment Haeckel (1869) defined ecology as "the study of reciprocal relationship between living organisms and their environment". Eugene P. Odum (1963) - "the study of structure and functions of nature". To understand nature, study of "structure and functions of abiotic and biotic components" is needed. Branches of ecology: 1. Habitat ecology: The study of living organisms in relationship to the habitat is called habitat ecology. Eg. Aquatic environment (Hydrophytes) Deserts (Xerophytes)

Q. No.	Obj.	Questions Answers
		2. Autecology: "The study of individual species in relation to its environment" is called autecology. It is also called species ecology. 3. Synecology: "The study of groups of plants or animals in relation to the environment is called syn ecology". Further divided into: (a) Population ecology: Study of interaction among different individuals of the same population. (b) Community ecology: Study of interactions among the individuals of different species and their environment. (c) Biome ecology: Study of interaction among different communities of a biome. (d) The study of relationships among the biotic and abiotic components of ecosystem.
2	K	What is an ecosystem ? Explain in detail the various components of a typical ecosystem ? Ans: "It is a system of living organisms and their environment which interact with one another and exchange materials". Components: 1. Abiotic · 2. Biotic 1. Abiotic - Non-living components 2. Biotic - living components Typical ecosystem - "Pond" Abiotic components of pond - 1. Heat 2. Light 3. pH of water 4. Organic and inorganic materials Inorganic: CO_2, O_2, Ca, N, P, K Organic : Amino acids - Hamic acids Biotic: All the living organisms in pond constitute the biotic component. 1. Producers 2. Primary consumers 3. Secondary consumers 4. Tertiary consumers 5. Decomposers

Q. No.	Obj.	Questions	Answers



Pond Ecosystem structure

1. Producers: Green plants, algae and autotrophic bacteria - which tap radiant energy and synthesis food by utilising CO_2. They are of two types: (a) Phytoplankton and (b) Macrophytes.

(a) Phytoplankton: Free floating plants or suspended microscopic plants are called phytoplankton.
Eg. Algae

Unicellular forms: Chlamydomonas, Desmids, Diatoms, Chlorella

Colonial form : Volvox, Pandorina, Eudorina, Pediastrum

Filamentous form : Spirogyra, Zygnema, Ulothrix, Oedogonium, Cladophora

(b) Macrophytes: The bigger plants present in ponds are classified as
(i) Floating plants:
Eg: Pistia, Eichhornia, Salvinia, Wolffia, Azolla, Lemna, etc.
(ii) Submerged plants: Plants live completely inside the water.
Eg: Hydrilla, Vallisneria, Utricularia, Ceratophyllum, Chara, Nitella, Ottelia.

Q. No.	Obj.	Questions	Answers
		Marginal plants: Plants at margins of pond. Eg: Typha, Trapa, Sagittaria, Ranunculus, Nymphaea, Marsilea, etc. Colocasia, Jussieua, Ipomoea, Polygonum, Neptunia, etc. (2) Primary consumers: These are the herbivores that feed directly on producers or remnants of producers. They are: (a) Zooplankton: These include the minute, free floating organisms which can move with water currents. They feed on phytoplankton: Euglena, Paramoecium, Cyclops, etc. (b) Benthos: Benthos includes organisms which are attached to the bottom of the pond or living in the bottom of sediment. They are also called "detrivores". Eg: Insect larva, Beetles, Hollusas, Periphyton. (i) Periphyton: includes herbivorous organisms which are attached to the stems and leaves of macrophytes. Eg: Water mites, leaches, Dragon fly, Hydra, etc. (ii) Nekton: Organisms which can move against water currents are called Nekton. Eg: Fishes (iii) Neuston: Organisms which can rest or swim on the surface of the water. Eg: Mosquito larva, Tadpole larva, etc. (3) Secondary consumers: These are carnivores which feed on primary consumers. Eg: insects, frogs, fishes, etc. (4) Tertiary consumers: These are the top carnivores which feed on secondary consumers and primary consumers. Eg: Large fish, birds, water snakes, etc. (5) Decomposers: These are the organisms which decompose the dead and decaying organic matter into simpler substances. They are also called micro consumers. Producers and consumers are degraded by the decomposers. They live in the bottom of the pond. These are helpful for recycling of materials in the pond ecosystem. Eg: saprophytic bacteria, actinomycetes, Fungal genera like Aspergillus, Rhizopus, Penicillium, Saprolegnia, Fusarium.	

TOPIC 17 : PLANT COMMUNITIES

CONTENT POINTS:

1 A group of individuals of different species is called a community. The study iof interactions among the individuals of different species another environment is called community ecology.

2. "The vegetation of plants of various species of a natural area living together, interacting with each other is referred to collectively as plant communities".

3. Classification of Plant Communities

4. Morphological and Anatomical Features

5. Adaptations - Morphological and Anatomical

6. Autotrophs - Autotrophic Nutrition

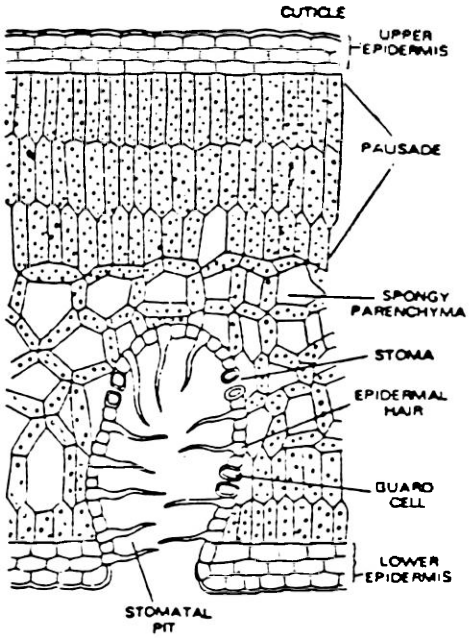
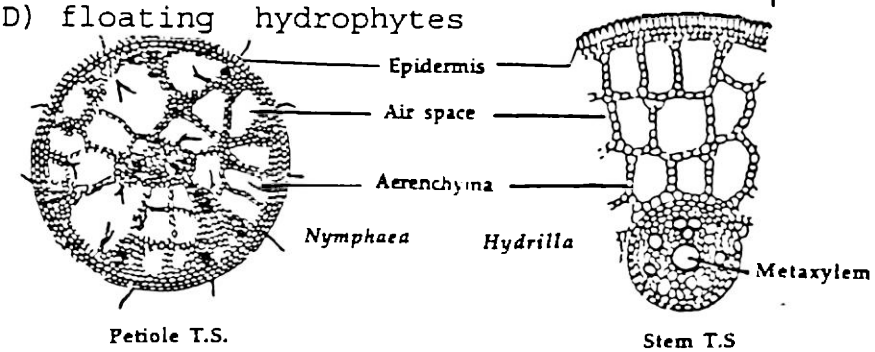
7. Heterotrophs - Heterotrophic Nutrition

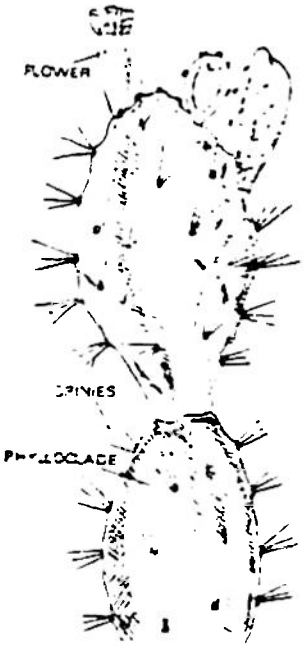
8. Carnivorous Plants

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Synecology deals with the study of A) Environment B) Individual study C) Plant community D) none of the above	C
2	U	Which of the following is not an aquatic plant A) Nymphaea B) Vallisneria C) Water melon D) Bladder wort	C

Q. No.	Obj.	Questions	Answers
3		The root cap is not found in these plants A) Hydrophytes B) Mesophytes C) Epiphytes D) Xerophytes	A
4		The epidermis is multilayered in A) Hydrophytes B) Halophytes C) Xerophytes D) Mesophytes	C
5	U	In these plants tap-root system is well developed to absorb water A) Hydrophytes B) Mesophytes C) Chemophytes D) Xerophytes	D
6		Stomata are absent in A) submerged plants B) floating plants C) nesophytic plants D) xerophytic plants	A
7	U	In free floating hydrophytes leaves are large to A) absorb maximum temperature B) maximum light C) maximum air D) maximum water	B

Q. No.	Obj.	Questions	Answers
8	U	<u>Vallisneria</u> is a water plant with A) submerged leaves B) floating leaves C) half submerged leaves D) no leaves	A
9		Succulent plants belong to A) physiological xerophytes B) drought escaping xerophytes C) drought avoiding xerophytes D) true xerophytes	B
10	U	Physical xerophytes develop on the soils A) with chemical condition in nature B) with saline condition in nature C) with physical dryness in nature D) with water logged condition in nature	C
11	U	You can differentiate between hydrophytes and xerophytes by A) presence of aerenchyma in xerophytes B) presence of cuticle on the leaves of hydrophytes C) presence of less stomata in hydrophytes D) presence of mechanical tissue in xerophytes	D

Q. No.	Obj.	Questions	Answers
12		In <u>Nerium</u> this type of stomata are common A) Normal stomata B) More stomata C) Sunken stomata D) No stomata  	C
13	U	Aerenchyma is very well developed in A) mesophytes B) halophytes C) submerged hydrophytes D) floating hydrophytes  	C

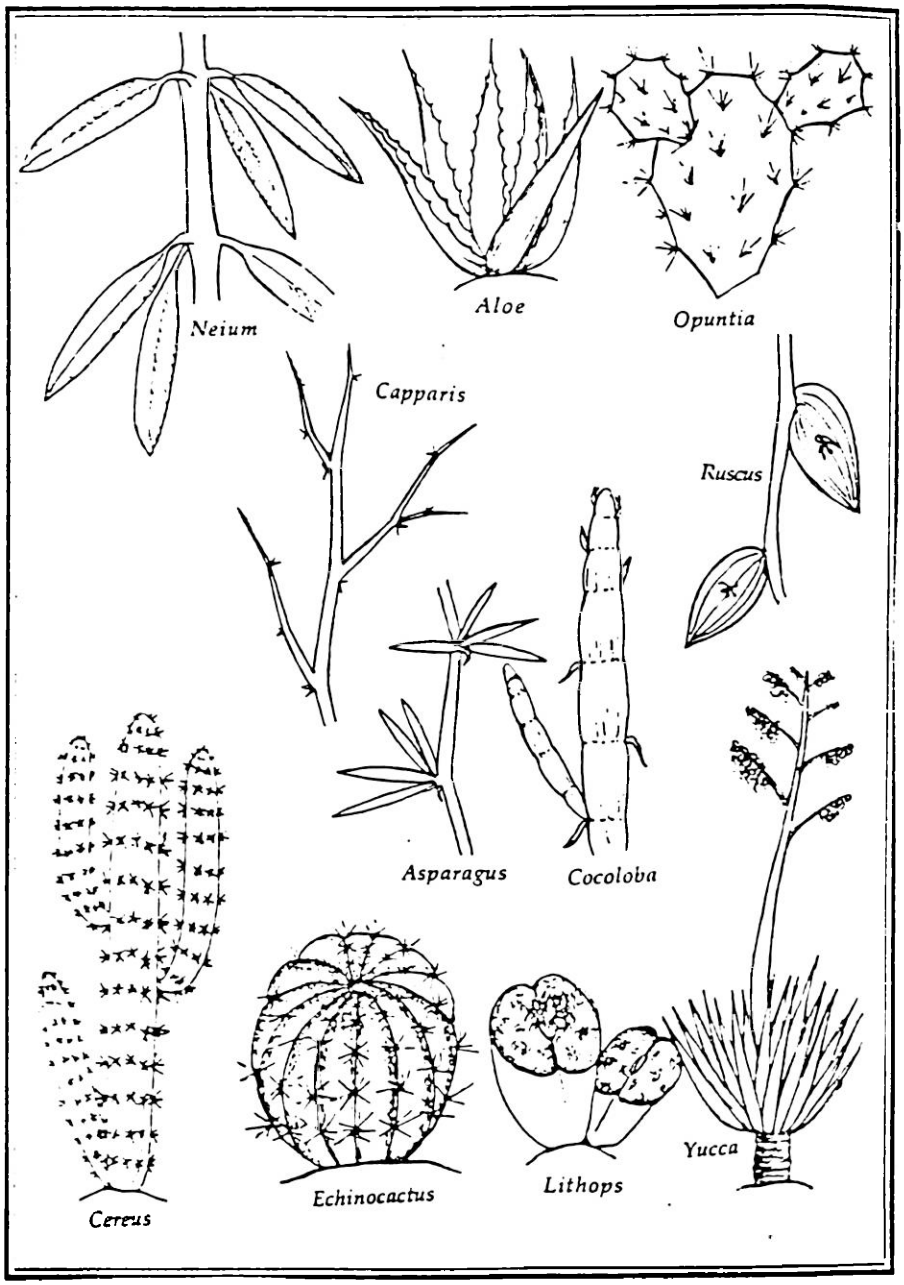
Q. No.	Obj.	Questions	Answers
14	U	Water storing tissue is present in A) Asparagus B) Casuarina C) Opuntia D) Acacia 	C
15	U	Heterophylly is found in this plant A) Vallisheria B) Typha C) Ceratophyllum D) Nymphaea	C
16	U	Which is the most common aquatic weed found in ponds ? A) Hydrilla B) Salvinia C) Eichhornia D) Azolla	C

Q. No.	Obj.	Questions	Answers
FILL-IN THE BLANKS			
1	K	Wolffia is a hydrophytic _____ plant.	free floating
2	K	A plant with phyllodes can be called as _____.	Xerophyte
3	K	_____ plants have less developed mechanical tissue and poorly developed vascular system.	Hydrophytic
4	K	Plants growing on sea shores are called _____.	Halophytes
5	K	_____ plants are called drought avoiding xerophytes.	Succulent
6	K	The plants living on sandy soils are called _____.	Psammophytes
7	K	Oxylophytes live on _____ soils.	acidic
8	K	A submerged plant with leaf traps is called _____.	Utricularia
9	K	An example of hydrophyte in pteridophytes is _____.	Marsilea
YES OR NO TYPE QUESTIONS			
1	U	Spinous modification of leaves is found in hydrophytes.	NO
2	U	The artificial ecosystem is called Aquarium.	YES
3	U	Aerenchyma is most commonly found tissue in halophytes.	NO
4	U	Eichhornia is considered to be the most common weed of fresh water ponds.	YES
5	U	In xerophytes the stomata are found in pits.	YES
6	U	Mangrove plants are found in saline muddy waters.	YES

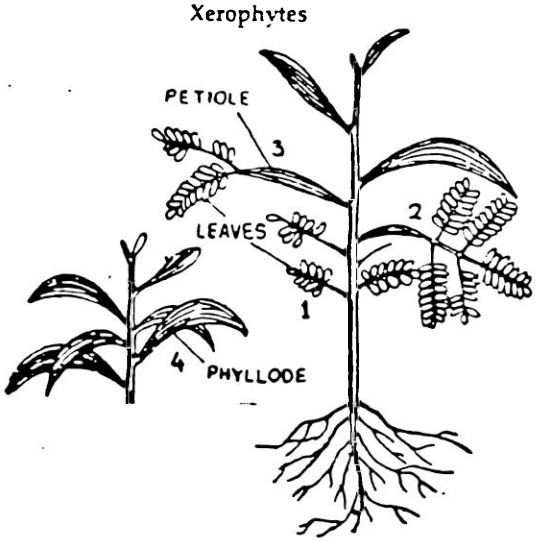
Q. No.	Obj.	Questions	Answers
7	U	Hydrophytic plants like Vallisheria. Hydrilla develop on the water surface.	NO
8	U	In Nymphaea leaves the stomata are found only on the lower side.	NO
9	U	The transpiration is very high in Calotropis and Opuntia.	NO
10	U	Epidermis is in many layers in some xerophytic plant leaves and stems.	YES
11	U	Two types of leaves are found in Ranunculus plants.	YES
12	U	Epistomatous leaves are found in submerged plants of hydrophytes.	NO
13	U	A waxy coating on leaves is found in Calotropis plants.	YES
14	K	The loss of leaves in xerophytes is substituted by the formation of cladodes.	YES
15	U	Distinguishing example of a true xerophyte is Casuarina.	YES
16	U	Stunted growth is observed in an amphibious plant.	NO
17	U	Ephemeral is a drought escaping xerophyte.	YES
18	U	The smallest angiosperic plant floating on water is Wolffia.	YES
VERY SHORT ANSWER QUESTIONS			
1	K	What is ecology ?	Oikos and Logos
2	K	Name one amphibious hydrophyte.	Typha, Polygonum, Marsilea
3	K	Give examples of phytoplanktons.	Spirogyra, Ulothrix, Volvox

Q. No.	Obj.	Questions	Answers
4	U	The insectivorous plant which lives in water.	Utricularia
5	U	In which hydrophytic plant you find rosette type of leaves.	Pistia
6	U	Give two examples of partial parasites	Loranthus, Viscum
7	U	In which hydrophytic plant hydrophily is most common ?	Vallisheria
8	U	The flat phylloclades are found in which plants ? 	Asperagus, Opuntia, Ruscus
9	K	What is the character of a mesophyte ? It lives in moderate moisture and temperature	
10	U	Which plants possess the stomata on two surfaces of leaves ?	Mesophytes
11	A	Why the insects are attracted and trapped in the leaves of some plants ? To obtain the proteins directly from insects and also those plant which slow in nitrogen deficient soils. Eg. Insectivorous plant Nepenthes	
12	U	In which plants do you find haustoria ?	Parasites
13	A	What type of plants are generally cultivated at sea coasts ?	Halophytes
14	A	What do you call those succulents which suffer dryness externally ?	Drought avoiding Xerophytes
15	K	What are drought escapers popularly known as ?	Ephemerals

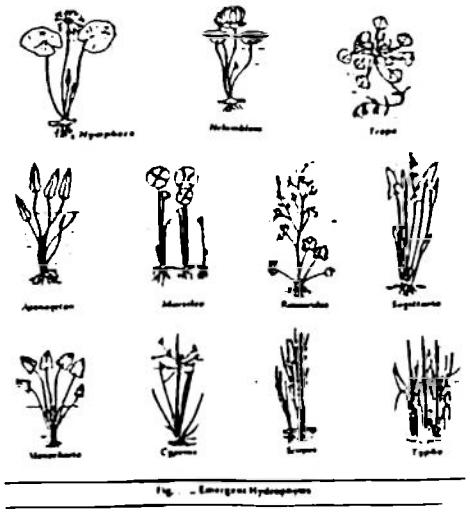
Q. No.	Obj.	Questions
SHORT ANSWER QUESTIONS		
1	U	Explain the habitat characters of Mesophytes ? Ans: Meosphytes grow under average conditions of temperature and moisture. Such habitats are called mesic. The water availability to these plants is neither in excess nor deficient. The plants grow best with moderate supply of water and express the characters between the xerophytes and hydrophytes. Cultivated garden plants and crop plants are the examples for mesophytes.
2	U	How are xerophytes classified based on drought ? Ans: Xerophytes are classified in to several groups according to their drought resistance power as - (A) Drought escaping plants: These are short lived. They survive in the form of seeds and fruits with hard seed coats and pericarps. Seeds germinate in favourable conditions and complete their life cycle before dry conditions approach. These plants are called ephemerals. (B) Drought enduring plants: These plants are small in size and have capacity to endure or tolerate drought. The water is stored in the organs to become fleshy or succulent. This plant suffer dryness externally avoiding drought internally. These are called drought avoiders. (C) True xerophytes: These plants withstand prolonged drought conditions, they are called perennial non-succulent plants. A number of morphological and anatomical modifications are developed to withstand and suffer dryness both externally and internally. These are called drought resistant xerophytes. eg. Acacia.



Xerophytes



Acacia phyllode. 1, 2, 3 and 4 show the gradual loss of pinnae and development of phyllode.

Q. No.	Obj.	Questions
3	U	Explain simple external adaptations shown by aquatic plants. Ans: In hydrophytes adaptations are observed both externally and internally. 1. Roots are absent or poorly developed. 2. Root hairs, root caps are absent. 3. Tufty balancing roots with root pockets develop in Pistia, Eichhornia, etc. 4. Stem is reduced in floating plants and slender in submerged, but highly developed only in amphibious plants like Typha. 5. Rosette leaves help the plants to float on water in Pistia, Eichhornia. 6. In Vallisneria, Hydrilla the leaves are thin and ribbon like. 7. Heterophyly is observed in emergent plants like Limnophylla. 8. Some leaves may have long petioles as in Nymphaea, Nelumbium, etc. 

Q. No.	Obj.	Questions
4	U	What are internal adaptations of hydrophytes ? Ans: The cuticle and stomata are absent in the epidermis of submerged plants, but stomata are epistomatous in floating leaves. The upper surface of the leaves is covered with waxy substance. Aerenchyma is well developed, and mechanical tissues like sclerenchyma and collenchyma are poorly developed. Vascular tissues are reduced and secondary growth is not common.

EVALUATION ITEMS IN ZOOLOGY

EVALUATION ITEMS IN ZOOLOGY

UNIT I : GENERAL CHARACTERS AND CLASSIFICATION OF CHORDATE GROUPS

TOPIC 1 : PISCES

CONTENT POINTS: General characters, classification placodermi, Chondrichthytes and Osteichthyes.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Air bladder is	B
		A. an excretory organ of fishes	
		B. an hydrostatic organ of fishes	
		C. a respiratory organ of fishes	
		D. none	
2	K	The peculiarity of fish heart is that it has	A
		A. all venous blood	
		B. all arterial blood	
		C. mixed blood	
		D. no blood	
3	K	Pharyngeal gill slits are found in	C
		A. Cray fish	
		B. Cuttle fish	
		C. Shark	
		D. Star fish	
4	K	Which of the fishes is famous for liver oil ?	D
		A. Amia	
		B. Ray	
		C. Whale	
		D. Cod	

Q. No.	Obj.	Questions	Answers
5	K	Water into the gills of fishes passes through A. nostrils B. gill slits C. mouth D. air bladder	C
6	K	In sharks the scales are A. placoid B. ctenoid C. cycloid D. gyanoid	A
7	K	Air bladder acts like a lung in A. bony fishes B. cyclostomus C. dipnoi fishes D. cartilagenous fishes	C
8	K	Heart pumps only impure blood in case of A. Shark B. Reptiles C. Whale D. Lizard	A
9	U	In a fish aquarium, green aquatic plants are grown primarily for A. carbondioxide B. fish feed C. oxygen D. decoration	C

Q. No.	Obj.	Questions	Answers
10	K	Gambusia offinis is a A. pest on fishes B. predator of mosquito larvae C. parasite on crab D. pathogenic protozoan	B
11	K	Air bladder is present in A. all fishes B. cartilaginous fishes C. bony fishes D. none of the above	C
12	K	In fishes, the scales are originated from A. Ectodermal B. Epidermal C. Endodermal D. Mesodermal	D
13	K	Which part of the ear is present in fishes ? A. Middle and inner ear B. External ear only C. Inner ear only D. Middle ear	C
14	K	The scales present in bony fishes are A. Cycloid B. Gyanoid C. Ctenoid D. All these	D

Q. No.	Obj.	Questions	Answers
15	K	The group of animals which exhibit discontinuous distribution is A. Sharks B. Snakes C. Dipnoi D. Frogs	C
16	K	Which of the following fish is a "living fossil" ? A. Lung fish B. Cod C. Latimaria D. Ichthyophis	C
FILL IN THE BLANKS			
1	K	Anamniotic chordates are_____ and _____.	Fishes & Amphibians
2	K	The functional kidneys in fishes are _____.	Mesonephric
3	U	The number of gill slits in sharks are _____.	Five pairs
4	K	_____ is a hammer headed Shark.	Sphyrna zygenea
5	K	Coelocanth was first discovered by _____.	Miss Latimer
6	K	_____ is a tiger shark.	Stegostoma
7	U	_____ is called as a flying fish since it has very large pectoral fins which help in flying over smaller distances in air.	Exocoetus

Q. No.	Obj.	Questions	Answers
MATCH THE FOLLOWING			
1	U	Match the following A — B 1. Cartilagenous fishes — a. Without jaws 2. Dipnoi — b. 4 pairs of gills 3. Osteichthyes — c. extinct fishes 4. Cyclostomes — d. placoid scales 5. Plascodermi — e. lung fishes	1-d 2-e 3-b 4-a 5-c
SHORT QUESTIONS			
1	K	What are the thermoreceptors present on the head of Shark ?	Ampullae or Lorenzini
2	K	What is the shape of heart of fishes ?	'S' shape
3	K	Name the chief excretory organs of fishes.	Mesonephric kidneys
4	K	Fishes are generally ammonotelic but one group of fishes are ureotelic. What is that group ? Ans: Elasmobronchii or Chondrichthyes or Cartilagenous fishes	
5	K	In fishes, the eye lids are absent but they are protected by a transparent skin. What is the name of that skin ?	Nictitating membrane
6	A	If the unpaired fins of a fish are removed, which function is impaired ?	Balance
7	K	What is the golden age of fishes ?	Devonian
8	K	Name the viviparous, cartilagenous fishes with internal fertilisation.	Sharks
9	K	Name the fish whose liver oil is rich in vitamin D.	Cod

Q. No.	Obj.	Questions	Answers
10	K	Name the fish that has electric organs?	Narcine or Torpedo
11	K	Which group of fishes are the first gnathostomes ?	Placodermi

SHORT ANSWERS

1 U

Mention the characters of cartilagenous fishes ?

Ans: Cartilagenous fishes are characterised by the presence of:
1. placoid scales
2. heterocercal tail
3. 5-7 pairs of gill slits
4. cartilagenous endoskeleton
5. intestine has a spiral valve
6. claspers are present in males

2 U

List out the distinguishing features of osteichthyes ?

Ans: 1. Endoskeleton is made up of bone.
2. Both marine and fresh water.
3. Only four pairs of gills
4. Scales are cycloid or ctenoid or ganoid
5. Tail is homocercal or heterocercal
6. Air bladder is present.

3 U

Name the group of fishes which exhibit discontinuous distribution and give examples along with their places of occurrence.

Ans: Dipnoi
Examples for Dipnoi are
(a) Neoceratodus found in the rivers of Queensland of Australia
(b) Protopterus found in the rivers of Africa.
(c) Lepidosiren found in the rivers of South America

TOPIC 2 : AMPHIBIA

CONTENT POINTS: General characters and classification - Apodaurodela and Anura

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Name the fishes which are called connecting link between amphibia and pisces. A. Cyclostomata B. Placodermi C. Elasmobronchii D. Dipnoi	D
2	K	Winter sleep is known as A. Aestivation B. Radiation C. Hibernation D. Gestation	C
3	U	Frog in water is A. Hypermetric B. Hypometric C. Myopic D. None	A
4	K	Endolymph is present in A. Lymphatic system B. Lymph glands C. Lymph ducts D. Membranous labyrinth	D

Q. No.	Obj.	Questions	Answers
5	K	Which of the following is associated with the sense of balance ? A. Columella auris B. Estachean tube C. Tympanum D. Ampullae	D
6	U	A frog differs from a toad in the absence of A. parotid glands B. warty and dry skin C. both D. none	C
7	K	Aestivation takes place in frog during A. winter B. summer C. autumn D. monsoon	B
8	K	Colour of frog skin is due to A. melanin B. melanophores C. porphyvin D. melatonin	B
9	K	The skin of frog is characterised by the absence of A. scales B. epidermis C. mucous glands D. chromatophores	A

Q. No.	Obj.	Questions	Answers
10	K	The amphibians without limbs are included in the order A. Amura B. Apoda C. Urodela D. Sailentia	B
11	U	In frog gastrulation is completed by A. emboly B. epiboly C. both D. none	C
12	K	The larva of frog is A. aquatic B. terrestrial C. amphibious D. fossorial	A
13	K	In tadpole larva the intestine is A. curved B. coiled C. straight D. U-shaped	B
14	K	The tadpole larva of frog in its last stage respires with the help of A. gills and lungs B. gills C. lungs D. skin	C & D

Q. No.	Obj.	Questions	Answers
SHORT QUESIONS			
1	K	Which amphibian has scales in its skin ?	Ichthyophis
2	K	Name the larva that exhibit neoteny.	Axolotle larva
3	K	In which order, the blindworms or caecilians are included ?	Apoda or Gymnophiona
4	K	Give the scientific name of the Indian Salamander.	Tilototriton
5	U	In male frog, which organs that act as resonators ?	Vocal sacs
6	K	Which is the larva of anura ?	Tadpole
7	K	What are the probable ancestors of amphibians ?	Crossoptery-gian fishes
8	U	Which group of animals are considered to be the first poikilothermic tetrapods ?	Amphibians
9	U	Name the group of amphibians which are without sternum ?	Apoda or Gymnophiana
10	K	In which group of amphibians have copulatory organs ?	Apoda or Gymnophiana
11	K	Name the third eye lid present in the amphibians.	Nictitating membrane
12	K	In which group of amphibians the limbs are of equal size.	Urodela
13	K	Name the limbless amphibian in which parental care is observed ?	Ichthyophis
14	K	Which period is considered as golden age of amphibians ?	Carboniferous period
15	U	What is the term coined for a larva that remains in larval stage for a prolonged period and attains sexual maturity ?	Neoteny or Paedogenesis

Q. No.	Obj.	Questions	Answers
16	K	In which order of class, amphibia, the salamanders are placed ?	Urodela
17	K	Some amphibians are blind and have elongated snake like body. Name those amphibians ?	Caecilians or Apodans

SHORT ANSWERS

1 U

Give five main features of the order, Urodela.

Ans: 1. These are scaleless amphibians with a tail in the adult stage.
2. They have two pairs of short, weak limbs which are equal in size.
3. Eyes are small and degenerated.
4. Persistant external gills found in some adult urodales.
5. Teeth present in both the jaws and vertebrae are amphicoelous.

2 U

Describe the main characters of the order, Apoda.

Ans: 1. They are limbless and tailless amphibians commonly called as caecilians or blind worms.
2. Body is worm-like, skin is wrinkled with small cycloid scales.
3. Eyes are degenerated and covered by the skin.
4. Head bears a pair of sensory tentacles.
5. Vertebrae are amphicoelous.
6. Copulatory organ present.

3 U

What is meant by neoteny ? Name the larva that exhibits neoteny.

Ans: Neoteny is the phenomena in which the larva remains in larval stage for a prolonged period and attains sexual maturity. Axolotl larva of Amblystoma exhibits neoteny or paedogenesis.

TOPIC 3 : REPTILIA

CONTENT POINTS: General characters, classification, identification of poisonous and non-poisonous snakes, poisonous snakes and poison apparatus.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	A snake has A. movable eye lids B. no eye lids C. immmovable eye lids D. only nictitating membrane	C
2	K	Which one of the following is not a true snake ? A. Coral snake B. Rat snake C. Glass snake D. Polind snake	C
3	K	The poison glands of a poisonous snake are modified A. buccal glands B. salivary glands C. mucous glands D. lacrimal glands	B
4	U	Which one of the following is not a poisonous snake ? A. Sea snake B. Bungarus C. Echis cavinata D. Python	D

Q. No.	Obj.	Questions	Answers
5	U	Eggs of reptiles can be designated as A. Microlecithal B. Alecithal C. Telolecithal D. Homolecithal	C
6	K	Identify the snakes which have laterally compressed tail. A. Cobra and Krait B. Cobra and Viper C. Viper and Hydrophis D. Hydrophis and Enhydrina	D
7	U	Large fourth infra labial helps to identify A. Cobra B. Viper C. Coral snake D. Krait	D
8	U	Viviparous snake is A. Cobra B. Viper C. Krait D. Rat snake	B
9	K	Venom of Viper affects A. circulatory system B. respiratory system C. digestive system D. excretory system	A

Q. No.	Obj.	Questions	Answers
10	K	Golden age of reptiles is A. Palacozoic B. Mesozoic C. Miocene D. Cretaceous	B
11	K	In Cobra, one of the following is highly distinguishing feature. A. Flat tail B. Ventrals enlarged C. Tappered and pointed tail D. Third supra labial touches eye and nostril	D
12	K	Typhlops is a A. Blind snake B. Glass snake C. Sea snake D. Tree snake	A
13	U	Snakes are devoid of A. Eyelids B. Limbs C. Girdles D. All of the above	D
14	K	Which of the following possesses vestigeal hind limb ? A. Cobra B. Python C. Krait D. Russel's viper	B

Q. No.	Obj.	Questions	Answers
15	K	Which one of the following is a largest non-poisonous snake ? A. Naja hanna B. Callophis C. Hemibungavus D. Python	D
FILL IN THE BLANKS			
1	K	_____ is the study of reptiles.	Herpatology
2	K	Heart of crocodile is_____ chambered.	four
3	K	Turtles and tortoises are grouped in the order_____.	Chelonia
4	K	Snakes are not found in_____ and _____.	New Zealand and Ireland
5	K	Poison of snake may be neurotoxic or _____.	haemotoxic
SHORT QUESTIONS			
1	K	In which group of animals ductus batalli connect systemic arch with the carotid arch ?	Reptilia
2	K	Which animal is considered as living fossil in the class, Reptilia ?	Sphenodon
3	K	What are the glands that modified into poisonous glands in snakes ?	Sub-maxillary glands
4	K	How many pairs of cranial nerves are present in snakes ?	Ten pairs
5	K	Name the reptile which has diaphragm and four chambered heart.	Crocodile
6	K	What is the scientific name of flying lizard ?	Draco
7	K	In which lizard the tail is prehensile?	Chaemeleon

Q. No.	Obj.	Questions	Answers
8	K	What is the shape of the vertebrals in Bungarus ?	Hexagonal
9	K	What is the term used for the scales of upper jaw ?	Supra labials
10	U	How do snakes perceive the sound waves?	Through bifid tongue and ribs
11	K	Name the olfactory organs of snakes.	Jacobson's organs
12	U	What is the characteristic feature of marine poisonous snakes ?	Laterally compressed tail
13	K	Which organ acts as the heat receptor in Trimeresurus ?	Loreal pit
14	U	Name the first group of animals that lay eggs on land.	Reptilia
MATCH THE FOLLOWING			
1	U	Match the following items given under Group A with those given under B.	
		A — B	
		1. Hydrophis — a. Four chambered heart	1-e
		2. Draco — b. Primitive lizard	2-d
		3. Sphenodon — c. A freshwater snake	3-b
		4. Crocodilia — d. Flying lizard	4-a
		5. Natrix — e. A sea snake	5-c
TRUE/FALSE			
1	U	Venom of Cobra is a neurotoxic	True
2	K	Foetal membranes are absent in reptiles	False
3	K	Python is the largest snake.	True
4	K	In crocodile, the heart is incompletely four chambered.	False

Q. No.	Obj.	Questions	Answers
5	K	Skull in all reptiles are dicondylar.	False
6	K	Turtles and tortoises are grouped in Chelonia.	True
7	K	Viper is a viviparous snake.	True
8	K	The golden age of reptiles is Devonian.	False
9	K	Sphenodon is found in New Zealand.	True
10	K	Hydrophis is a freshwater snake.	False
11	U	The venom which affect nervous system is known as haemotoxic.	False
12	K	Natrix is a non-poisonous sea snake.	False
13	K	New Zealand and Ireland are devoid of snakes.	True
14	K	Copulatory organs are present in the males of reptilia except Sphenodon.	True

SHORT ANSWERS

1 K Describe the characters of Sphenodon.

Ans: 1. Sphenodon is the only living representatives of the order, Rhyncoephalia.
2. It is a primitive lizard found only in New Zealand.
3. The skin is scaly and with a dorsal crest.
4. Skull is diapsid and vertebrae are amphicoelous.
5. Penial eye is present.
6. Copulatory organ is absent.

2 K Mention four main characters of the order Chelonia.

Ans: 1. It includes turtles and tortoises.
2. Trunk is enclosed in a bony shell composed of dorsal carapace and a ventral plastron.
3. Skull is anapsid.
4. Jaws are devoid of teeth.
5. Ductus botalli is present.
Eg: Dermochelis, Chelone mydas

Q. No.	Obj.	Questions	Answers
3	K	Describe the characters of the order, Crocodilia and give two examples.	Ans: 1. It includes crocodiles and alligators. 2. Largest living fresh water reptiles. 3. Tail is long and laterally compressed. 4. Body is covered by scutes and horny epidermal plates. 5. Jaws are elongated with thecodont dentition. 6. Heart is four chambered. 7. Diaphragm is present. Eg: Crocodilus and Gavialis
LONG ANSWERS			
1	U	Enumerate the general characters of reptilia.	Ans: 1. Poikilothermous or ectothermal. 2. Skin dry, skin glands are absent. 3. Body covered by horny epidermal scales. 4. Two pairs of pantadactyle limbs are present except in snakes. 5. Skull is monocondylic. 6. Vertebrae are procoelous. 7. Skull bears temporal fossae and arcades. 8. Teeth are present in both the jaws (except in Chelonia). 9. Heart is incompletely four chambered (except in Crocodilia). 10. Twelve pairs of cranial nerves are present (except in Ophidia). 11. Excretion by a pair of metanephros. Secretory substance is uric acid. 12. Eggs are megalecithal. Cleavage is meroblastic. Extra embryonic membranes present.
2	U	Classify the class, reptilia upto orders and give examples for each order.	Ans: It is divided into four orders. 1. Order: Rhyncocephalia: a) Primitive lizard b) Diapsid skull, Amphicoelous vertebrae c) Copulatory organs absent d) Penial eye present 2. Order: Chelonia a) Turtles and tortoises included b) Bony shell consists carapace and plastron c) Anapsid skull d) Jaws without teeth e) Ductus botalli present Eg: Dermochelis and Chelone mydas

Q. No.	Obj.	Questions Answers
		3. Order: Crocodilia a) Includes Crocodiles and Alligators b) Laterally compressed tail c) Body covered by scutes and plates d) Thecodont dentition e) Four chambered heart f) Diaphragm present Eg: Crocodilus and Gavialis 4. Order: Squamata. It includes two subordes: I. Suborder: Lacertalia a) Includes lizards b) Eye lids movable c) Quadrate is immovable d) Ductus caroticus is present Eg: Varanus and Calotes II. Suborder: Ophidia a) Includes snakes b) Body covered by scales and moulting occurs several times c) Limbs, sternum, tympanum are absent d) Eye lids immovable and tongue is bifid and protrusable e) Lungs, kidneys and gonads are asymmetrical Eg: Naja naja and Typhlops
3	U	How do you distinguish the poisonous snakes from the non-poisonous snakes ? Ans: Poisonous snakes can be distinguished from the non-poisonous snakes with the help of the following characters: 1. Nature of tail: Laterally compressed: Sea snakes, deadly poisonous. Hydrophis and Enhydrina. Round and pointed may be a poisonous or non-poisonous. 2. Nature of the ventral scales: Three types of arrangement is found. a) Small scales in many rows - non-poisonous b) Broad scales in middle and small scales on either side - non-poisonous. c) Ventrals are broad extending completely across the belly - poisonous. 3. Nature of the scales or shields on the head: Head triangular with small scales. It is a viper. All vipers are poisonous. It loveal pit is present, it is a pit viper, i.e. Trimeresurus. If pit is absent, it is a pitless viper.

Q. No.	Obj.	Questions	Answers
		4. Nature of the sub-caudals scales If the subcaudals arranged in two rows, then it is Russel's Viper. If the sub-caudals arranged in one row and an arrow mark is present on the head, then it is Echis carinata. 5. Nature of the veretebrals scales If the head is covered by shields, it may be poisonous or non-poisonous. If the vertebrals are large and hexagonal in shape, then it is a Krait. It is poisonous. In Kraits the fouth infra labial is the largest. If there is no peculiarity in vertebrals and third supra labial is touching the eye and nasal scale, then it is a Cobra. All Cobras are poisonous. Hood is present at the neck region in Cobras.	

TOPIC 4 : STRUCTURAL AND FUNCTIONAL ORGANISATION OF CHORDATES WITH REFERENCE TO AMPHIBIA AND MAMMALIA

SUBTOPIC : SKELETAL SYSTEM

CONTENT POINTS: Skull, vertebral column, pectoral and pelvic girdles, bones of fore and hind limbs.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Which vertebra of frog is amphicoelous ? A. Eighth vertebra B. Atlas vertebra C. Ninth vertebra D. Typical vertebra	A
2	K	Typical vertebra of frog is A. Heterocoelous B. Amphicoelous C. Procoelous D. Acoelous	C
3	K	Ninth vertegrea of frog is A. Amphicoelous B. Acoelous C. Heterocoelous D. Procoelous	B
4	K	Hyoid apparatus of frog is made up of A. bone B. cartilage C. tissue cartilage D. muscles	B

Q. No.	Obj.	Questions	Answers
5	K	The floor of the cranium is formed by a 'T' shaped bone called A. Parasphenoid B. Pterygoid C. Palatine D. Fronto-parietal	A
6	U	In which skeletal structure of frog the bone, scapula is found ? A. Pelvic girdle B. Pectoral girdle C. Skull D. Cranium	B
7	K	The clavicle is found in A. pelvic girdle B. pectoral girdle C. skull D. hyoid apparatus	B
8	K	Neural spine is found in A. urostyle B. nerve cord C. nasal cavity D. typical vertebra	D
9	K	The skull of the frog and rabbit are classified as A. dicondylic B. monocondylic C. acondylic D. tricondylic	A

Q. No.	Obj.	Questions	Answers
SHORT QUESTIONS			
1	K	What structure in frog gives support to the tongue ?	Hyoid apparatus
2	U	Name the bones which form the roof of the frog brain case.	Fronto-parietals
3	K	How many bones are present in the cranium of frog ?	Six
4	K	What is the bone present in the auditory capsule of frog ?	Prootic
5	K	What is the largest bone in the pelvic girdle of frog ?	Ilium
6	K	Which is the calcified cartilagenous structure in the pectoral girdle of frog ?	Suprascapula
7	K	Which one is the acoelous vertebra in the vertebral column of frog ?	Ninth
8	U	A ball and socket joint is found in the pectoral girdle then what type of joint is formed in the pelvic girdle.	The same ball and socket joint
9	K	What additional bones help the frog in jumping ?	Astragalus, calcaneum
MATCH THE FOLLOWING			
1	K	Match the bones of frog with the structures found in its skeleton.	
		A — B	
		1. Sphenethmoid — a. Vertebra	1-c
		2. Angulosplenial — b. Pelvic girdle	2-d
		3. Centrum — c. Skull	3-a
		4. Clavicle — d. Lower jaw	4-e
		5. Ischium — e. Pectoral girdle	5-b

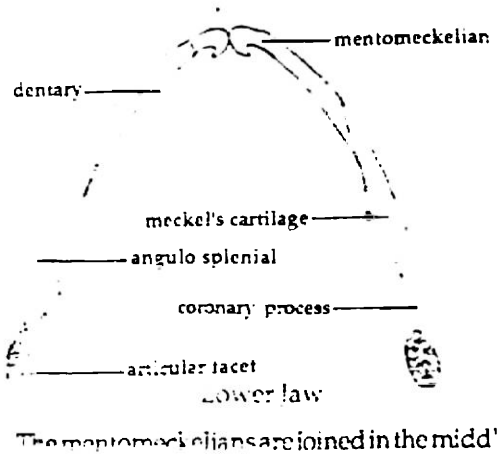
Q. No.	Obj.	Questions	Answers
2	K	Match the following bones of frog with the part of the limb in which they are found. A — B 1. Femur — a. In step 2. Tibio-fibula — b. Toes 3. Tarsals — c. Thigh 4. Metatarsals — d. Shank 5. Phalanges — e. Ankle	1-c 2-d 3-e 4-a 5-b
3	K	Match the following A — B 1. Forelimb — a. Glenoid cavity 2. Skull — b. Urostyle 3. Pectoral girdle — c. Radio-ulna 4. Hind limb — d. Foramen magnum 5. Vertebral column — e. Astragalus and calcaneum	1-c 2-d 3-a 4-e 5-b
SHORT QUESTIONS			
1	K	During the embryonic development the endoskeleton of frog develops from the germ layer_____.	Mesoderm
2	K	The 'Y' shaped bone in the skull of frog is_____.	Pterygoid
3	K	_____ supports the skull and bears the entire weight of the skull.	The Atlas
4	U	Though the sternum of frog is a part of axial skeleton, it closely associates with the_____ of appendicular skeleton.	Pectoral girdle

Q. No.	Obj.	Questions	Answers
5	K	In birds the cervical vertebrae are _____.	Hetero-coelous
6	K	Intervertebral discs are found in _____.	Mammals
7	K	_____ are the only bony structures in the hyoid apparatus of frog.	Posterior cornua

SHORT ANSWERS

1 S Draw a neat labelled diagram of lower jaw of frog.

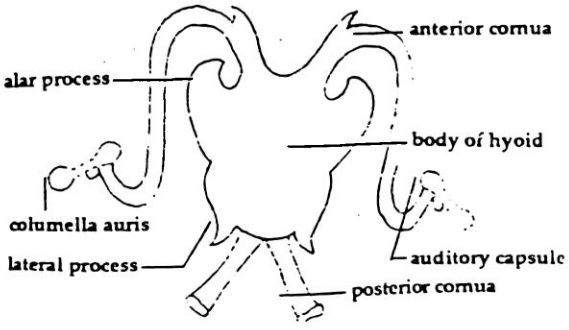
Ans:



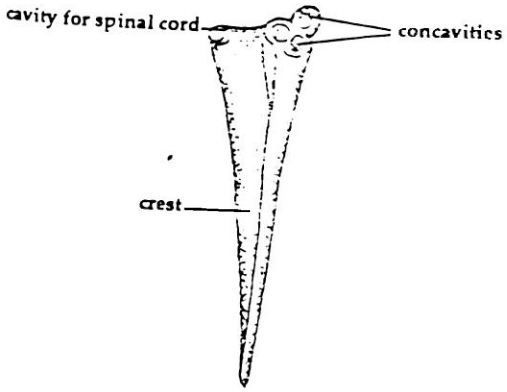
The mentomeckelians are joined in the midd'

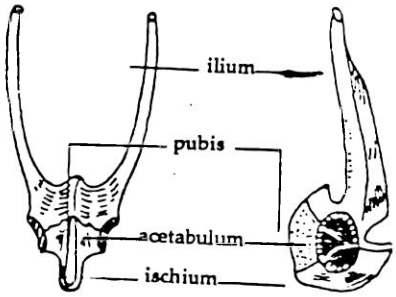
2 S Draw a neat labelled sketch of hyoid apparatus of frog.

Ans:



Q. No.	Obj.	Questions	Answers
3	S	Draw a neat diagram of urostyle of frog and label it. Ans:	
4	S	Draw a neat labelled sketch of pelvic girdle of frog. Ans:	





UNIT II : STRUCTURAL AND FUNCTIONAL ORGANISATION OF CHORDATES

TOPIC 5 : FROG - DIGESTIVE SYSTEM

CONTENT POINTS: Alimentary Canal, Digestive Glands and Process of Digestion.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The main function of HCl in stomach is to A. facilitate absorption of food B. dissolve enzymes C. inactivate enzymes D. activate pepsinogn to pepsin	D
2	K	Specific function of liver is A. excretion B. digestion C. glycogenolysis D. histolysis	C
3	U	In which form the liver stores the food ? A. ATP B. Glucose C. Glycogen D. Lipids	C
4	K	Digestion of proteins, fats and carbohydrates is completed in A. colon B. stomach C. ileum D. duodenum	C

Q. No.	Obj.	Questions	Answers
5	U	What function the bile juice mainly promotes ? A. It emulsifies fats B. It digests fats by enzymatic action C. It eliminates waste products D. It helps in the regular digestion of proteins	A
6	K	Pancreas secretes A. ptyalin B. pepsin C. bile juice D. trypsinogen	D
7	K	Lipase is an enzyme that acts on A. carbohydrates B. proteins C. lipids D. albumins	C
8	K	Lipase is present in A. bile juice B. pancreatic juice C. saliva D. intestinal juice	B
9	U	Bile juice aids in digestion and absorption of fats because it contains A. bile pigments B. bile salts C. bicarbonates D. all of them	B

Q. No.	Obj.	Questions	Answers
10	K	Amino acids produced by digestion of proteins are absorbed in intestine through A. lacteals B. rectum C. blood capilaries in the villi	C
11	K	Gastric glands secret A. HCl B. Pepsinogen C. Mucous D. All	D
12	K	Which cells of gastric glands secret HCl ? A. Gastric cells B. Peptic cells C. Goblet cells D. Oxyntic cells	D
13	K	The glucose is converted into glycogen and stored in A. liver and spleen B. liver and pancreas C. liver D. liver and muscles	D
14	K	Milk protein is acted upon by a gastric enzyme A. Caesin B. Renin C. Pepsin D. Trypsin	B

Q. No.	Obj.	Questions	Answers
15	K	Some proteolytic enzymes are A. trypsin, lipase, amylase B. trypsin, pepsin, peptidase C. amylase, pepsin, peptidase D. lipase, trypsin, pepsin	B
16	K	All enzymes chemically speaking are A. proteins B. lipids C. lipoproteins D. carbohydrates	A
17	K	Bile juice helps in A. emulsification B. producing enzymes C. digestion D. all	A
18	K	The end product of fat digestion is A. fatty acids B. glycerol C. fatty acids and glycerol D. none	C
19	K	Trypsinogen is activated by A. secretion B. gastrin C. pancreozymin D. enterokinase	D

Q. No.	Obj.	Questions	Answers
20	K	Maximum energy is produced by A. carbohydrates B. fats C. proteins D. minerals	B
21	K	Which part of the alimentary canal regulates the entry from the stomach into the duodenum ? A. Cardiac sphincter B. Duodenum C. Pyloric sphincter D. Rictal sphincter	C
22	K	The part of vertebrate body with highest regeneration capacity A. Pancreas B. Liver C. Spleen D. Skin	D
23	K	Which one among the following vitamins is recently discovered that has anticancer properties ? A. Vitamin B_{17} B. Vitamin K C. Vitamin B_6 D. Vitamin A	A

Q. No.	Obj.	Questions	Answers
24	K	The structural unit of protein is A. peptones B. proteoses C. polypeptides D. amino acid	D
SHORT QUESTIONS			
1	K	How many times does the teeth formation occur in frog ?	Many times in its life.
2	K	Which glands are absent in the bucco-pharyngeal glands of frog ?	Salivary glands
3	K	Name the longitudinal internal folds of stomach of frog.	Rugae
4	U	In which organ of frog the synthesis of fibrinogen and prothrombin occur ?	Liver
5	K	What is the mode of nutrition in frog ?	Holozoic type
6	K	What vitamins that are stored in liver ?	Vitamins A, B_{12}, D, K & E
7	K	What bile salts are present in the bile juice ? Ans: Glycocholate and taurocholate of sodium and potassium	
8	K	Name the openings present on the posterolateral sides of the buccal cavity of frog.	Eustachian apertures
9	U	In which gland of frog the enzyme, trypsin is produced ?	Pancreas
10	U	Name the crypts/islands of the intestine that secrete succus entricus?	Crypts of Lieberkuhn

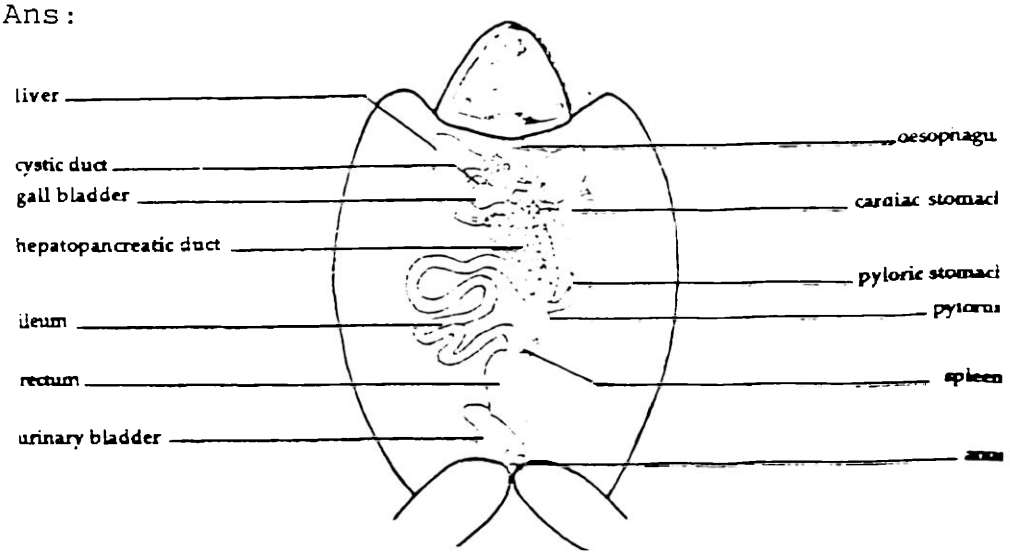
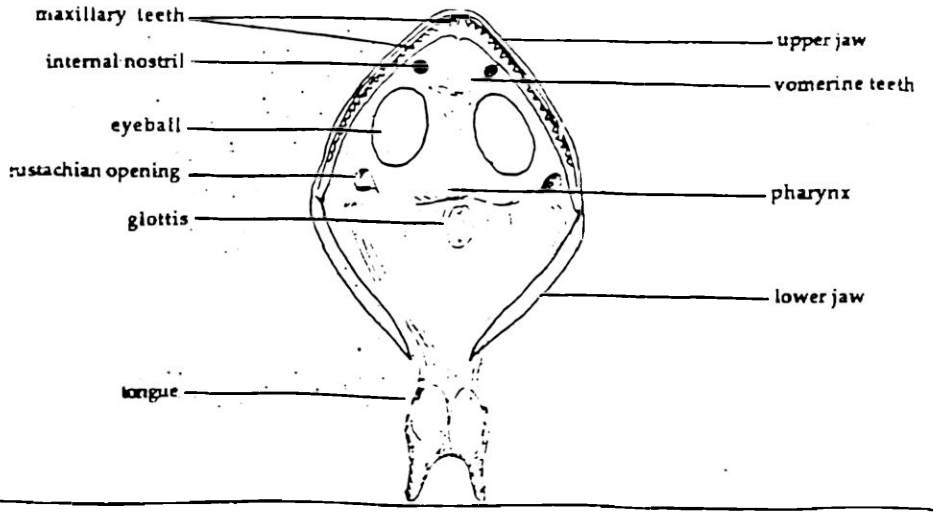
Q. No.	Obj.	Questions	Answers
11.	U	What the different types of cells are present in the islets of Langerhams and their secretions ? Ans: Alfa cells secrete glucogon and beta cells secrete insulin.	
12	K	Which cells in the gastric glands secrete HCl and pepsinogen ? Ans: The oxyntic cells secrete HCl and zymogen or peptic cells secrete pepsinogen.	
13	K	Which epithelial tissue covers the buccal cavity of frog ?	Ciliated epithelium
14	K	Name the structure that regulates the passage of food from stomach into intestine in frog.	Pyloric sphincter
15	U	Name the gland which secretes both enzymes and hormones.	Pancreas
16	K	Deficiency of which hormone causes diabetes millitus condition in human beings ?	Insulin
17	U	Which substances do not undergo any change in the stomach of frog ?	Carbohydrates and fats
18	K	On which bones teath are present in frog ?	Premaxilla, maxilla and vomers
19	U	Which constituent of food of frog is partly digested in stomach ?	Proteins
20	K	In which form the excess of food is stored in the liver of frog ?	Glycogen
21	K	Who discovered the process of digestion ?	Beanment
22	U	Frog cannot chew the food. Why ? Ans: Because the teeth are absent on the lower jaw or teeth are present only on the upper jaw.	

Q. No.	Obj.	Questions	Answers
SHORT ANSWER			
1	U	Name the spacious cavity found in between the upper and lower jaws of frog and explain its structure ?	Ans: 1. Buccopharyngeal cavity 2. Maxillary and vomerise teeth 3. Protrusable and bifurcated tongue 4. Eustachian apertures, glottis, pharynx, etc.
2	U	Mention the names of digestive glands of frog that are found outside the alimentary canal and add a note on their functions ?	Ans: 1. Liver and pancreas 2. Any four functions of liver 3. Any four functions of pancreas
3	U	Enumerate the important functions of liver ?	Ans: 1. Secretes bile juice 2. Bile salts help in emulsification of fats 3. Converts excess glucose into glycogen 4. Excretes bile pigments 5. Produces heparin and fibrinogen 6. Deamination, etc.
4	U	Name the gland which is both exocrine and endocrine in function ? Describe it in detail ?	Ans: 1. Pancreas 2. Produces pancreatic juice which contains amylase, lipase and trypsinogen 3. Also secretes hormones such as glucogon and insulin
5	U	Name any four gatro-intestinal hormones of frog and mention their functions.	Ans: 1. Enterokinase converts trypsinogen to trypsin. 2. Pancreozymin initiates pancreas to secrete its juice. 3. Gastrin stimulates gastric glands to secrete gastric juice. 4. Cholecystokinin stimulates gall-bladder to release bile juice.

Q. No.	Obj.	Questions Answers
6	S/U	Explain the histological structure of alimentary canal in frog. Ans: 1. Serous layer 2. Muscular layer 3. Submucosal layer and 4. Mucosal layer
7	U	Describe the dentition in frog and explain how it helps in the process of ingestion. Ans: 1. Maxillary and vomerine teeth 2. Homodont and pleurodont dentition 3. Helps in preventing the escape of prey from the buccal cavity.
8	U	Describe the glands present in the alimentary canal of frog. Ans: 1. Gastric glands and intestinal glands. 2. Gastric glands secrete gastric juice which contains HCl, pepsinogen and mucous. 3. Intestinal glands secrete succus entricus containing erepsin, maltase and lipase besides a hormone called enterokinase.
9	U	Explain in detail the process of digestion in the intestine of frog ? Ans: 1. Bile juice and its actions 2. Pancreatic juice and its actions 3. Intestinal juice and its actions
10	U	Describe the chemical composition and functions of the constituents of gastric juice in frog ? Ans: 1. Contains HCl, pepsinogen, mucous and water. 2. HCl converts pepsinogen into pepsin, and kills microbes. 3. Pepsin digests proteins into proteoses and peptones. 4. Mucous helps in protecting the mucosal layer and also facilitates free passage of food.

Q. No.	Obj.	Questions Answers
11	U	Mention various types of digestive juices that are secreted into the alimentary canal of frog and list out the enzymes present in them ? Ans: 1. Gastric juice contains HCl. 2. Bile juice contains bile salts. 3. Pancreatic juice contains trypsinogen, amylase and lipase. 4. Succus entricus contains erepsin, maltase and lipase.
12	U	How the end products of digestion are absorbed and assimilated in the alimentary canal of frog ? Ans: 1. Glucose is absorbed through villi by passive transport. It is oxidised in the tissues. 2. Amino acids also absorbed through villi by passive transport. They are used in the synthesis of new proteins. 3. Fatty acids and glycerol through lacteals by active transport and converted into fat globules in the blood.
13	U	Mention the end products of the process of digestion in frog and how are they absorbed ? Ans: 1. Glucose from carbohydrates. By passive transport through micro villi. 2. Amino acids from proteins. By passive transport through micro villi. 3. Glycerol and fatty acids from lipids. By active transport through lacteals.
14	U	A person is suffering from diabetes. What is the hormone that causes diabetes and by which gland it is secreted ? Ans: 1. Insulin 2. It is secreted by the beta cells of Langerhans in pancreatic gland. 3. It converts excess glucose into glycogen.
15	K	Define digestion and name the various digestive juices secreted in frog. Ans: 1. Definition - The complex food substances undergo physico-chemical changes and changed into simple, soluble and absorbable state. 2. Juices from glands outside the alimentary canal - Bile and pancreatic juice. 3. Gastric and intestinal juices from the alimentary canal.

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	U	Give an account of the alimentary canal of frog and its associated glands.	Ans: Description of the following parts of alimentary canal and its associated glands has to be given. Alimentary canal: 1. Mouth, 2. Buccal cavity, 3. Oesophagus, 4.Stomach, 5. Small intestine, 6. Rectum, 7. Cloaca. Glands: 1. Liver, 2. Pancreas, 3. Gastric and 4. Intestinal glands.
2	U	Describe the process of digestion in frog ?	Ans: The process of digestion includes: 1. Ingestion 2. Digestion in stomach 3. Digestion in small intestine 4. Assimilation and 5. Egestion
3	U	What are the digestive glands present outside the alimentary canal of frog ? Describe them in detail and enumerate their functions ?	Ans: 1. Liver and pancreas 2. Description of liver 3. Functions of liver 4. Description of pancreas 5. Functions of pancreas
4	U	Enumerate the list of enzymes that take part in the digestion of food in frog and show their reactions ?	Ans: The following are the list of enzymes and the reactions they bring about in the digestion of frog: 1. Pepsin+proteins $\xrightarrow{H_2O}$ Proteoses and peptones 2. Trypsin+Proteoses and Peptones+H_2O --> Polypeptides 3. Polypeptidases+Polypeptides $\xrightarrow{H_2O}$ Exopeptides 4. Exopeptidases+Exopeptides $\xrightarrow{H_2O}$ Amino acids 5. Amylopsin+Carbohydrates $\xrightarrow{H_2O}$ Maltose 6. Maltose+Maltase $\xrightarrow{H_2O}$ Glucose 7. Emulsified fats+H_2O ----> Mono and diglycerides 8. Partly digested fats + Intestinal lipase + H_2O -----> Fatty acids and glycerol.

Q. No.	Obj.	Questions	Answers
5	U	What are the physico-chemical changes, the food undergoes in the digestion of frog ?	Ans: The food undergoes various physico-chemical processes in different parts of alimentary canal and it includes: 1. Ingestion 2. Digestion in stomach 3. Digestion in the intestine 4. Assimilation and 5. Egestion
6	S	Draw a neat labelled diagram of the digestive system of frog.	Ans: 
7	S	Draw a neat labelled diagram of buccal cavity of frog?	Ans: 

TOPIC 6 : RESPIRATORY SYSTEM

CONTENT POINTS: Cutaneous, Buccopharyngeal and Pulmonary respirations.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Which one of the following is not a energy rich compound ? A. ATP B. ADP C. AMP D. Creatine phosphate	D
2	U	Form of energy used in respiration is A. chemical B. radiant C. electrical D. mechanical	A
3	A	Amount of energy in calories released when one molecule of ATP is hydrolysed to ADP. A. 73000 B. 68600 C. 730 D. 7300	D
4	U	End products of complete carbohydrate metabolism are A. CO_2 + H_2O B. CO_2 + Pyruvic acid C. Lactic acid + Acetyl CoA D. None	A

Q. No.	Obj.	Questions	Answers
5	K	Enzymes differ from ordinary catalysts in that they are A. non-proteins B. all proteins C. produced outside cell D. none	B
6	K	Cell organelle which are called 'power house' of a cell are A. nucleus B. mitochondria C. goligi D. ribosomes	B
7	K	Which of the following will be different in different animals ? A. Fats B. Carbohydrates C. Proteins D. Vitamins	C
FILL IN THE BLANKS			
1	K	For active transport_____ is required.	requires energy
2	U	The process of deriving glucose from fats and proteins is called_____.	Gluconeo-genesis
3	K	Conversion of glycogen into glucose is called_____.	Glycoge-nolysis
4	U	The end products of glycolysis is _____.	pyruvic acid
5	K	Oxidative phosphorylation in a cell takes place in_____.	Mitochondria
6	K	Constructive activities related with _____.	Anabolism

Q. No.	Obj.	Questions	Answers
7	K	Metabolic processes in the body are catalysed by_____.	Enzymes
8	U	Where is energy stored as reserve food _____.	Adipose tissue
9	U	In the body of living organisms, the energy currency is_____.	ATP
10	U	Respiration is characterised by_____.	Intake of O_2 liberation of CO_2 and production of energy
11	K	In mammals, carbohydrates are stored as _____.	glycogen in liver and muscles
12	U	Metabolism means sum total of_____.	energy release and gain process
13	A	More energy is produced from 1 gm of _____.	Fat
14	K	Fermentation is a process of_____.	Anaerobic respiration
15	K	ATP synthesis takes place in_____.	Mitochondria
MATCH THE FOLLOWING			
1	K	Match the following terms given under 'A' with those given under 'B'. A: 1. Alveoli; 2. Asphyxia; 3. Internal respiration; 4. Anaerobic respiration; 5. External respiration B: a. exchange of respiratory gases in the respiratory surfaces; b. oxidation of food materials in the tissues; c. a process of respiration that takes place in inoxic conditions; d. sites of gaseous exchange; e. a condition in which frog dies due to lack of respiration	1-d 2-e 3-b 4-c 5-a

Q. No.	Obj.	Questions	Answers
2	K	Match the following A — B 1. Aspiration — a. state of dormoncy in winter 2. Oxygenation — b. state of dormancy in summer 3. ATP — c. first phase of inspiration 4. Hibernation — d. in living organisms energy is stored in this compound 5. Aestivation — e. a chemical process by which oxygen combines with haemoglobin to form oxyhaemoglobin	1-c 2-e 3-d 4-a 5-b
SHORT QUESTIONS			
1	K	What is the cavity present in between the two adjacent primary trabeculae ?	Infundibulum
2	K	Which are the respiratory organs of frog ?	Skin & lungs
3	K	What is the percentage of O_2 and CO_2 in atmospheric air ?	20.95% and 0.03% respectively
4	K	How many cartilagenous plates support the laryngotracheal chamber ?	Five
5	K	How many times the floor of the buccopharyngeal cavity in frog moves up and down per minute ?	80-120 times per minute
6	K	Mention the name of the artery that supplies blood to the lungs in frog.	Pulmonary artery
7	K	How much of haemoglobin is present in 100 ml of blood in frog ?	6.10 gms
8	K	Which organ of frog act as hydrostatic organs ?	Lungs
9	K	What term you coin when the respiration takes place in the absence of O_2 ?	Anaerobic

Q. No.	Obj.	Questions	Answers
10	U	How many molecules of O_2 can be carried by a haemoglobin molecule ?	Four
11	U	Why the female frog is unable to produce croacking sound inspite of having vocal cords ?	Due to the absence of vocal sacs
12	U	What are the structures that are absent in the lungs of frog but present in a mammal ?	Bronchioles
13	U	What is the chemical that is formed when CO_2 combines with haemoglobin of blood ?	Carbamino-haemoglobin
14	U	What is the ratio of the movements of buccopharyngeal cavity to the expansion of lungs per minute in frog ?	120:1
15	K	What are the processes involved in the break down of sugars and subsequent release of energy ?	Glycolysis, Kreb's cycle and electron transport
16	K	How many ATP molecules are formed from one molecule of sugar ?	38
17	U	What is the metabolic process during which oxidation of food substances release energy ?	Catabolism
18	K	What are the functional units of the lungs of frog ?	Alveoli
19	U	Why is the ratio of nitrogen in inspired and expired air remains same ? Ans: Because it is not a respiratory gas and moreover it does not undergo any physico-chemical change during respiration.	
20	A	What happens, if frog's skin is dried ?	Pulmonary respiration help it.

Q. No.	Obj.	Questions	Answers
21	A	What happens if the sound box of frog is tied tightly with a thread ?	Pulmonary respiration stops but it continues its normal life.

SHORT ANSWERS

1 U

Describe the process of cutaneous respiration in frog.

Ans: 1. The respiration that takes place through skin is called cutaneous respiration.
2. The skin is moist and richly supplied with blood capillaries.
3. Gaseous exchange takes place by diffusion.

2 U

What is buccopharyngeal respiration ? Explain it.

Ans: 1. The respiration in frog that takes place through the buccal cavity is called buccopharyngeal respiration.
2. Air from outside enters into the buccal cavity due to the movements of the floor of the buccal cavity.
3. The wall of buccal cavity is richly vascularised and exchange of gases takes place between the air in the buccal cavity and the blood in the capillaries.

3 U

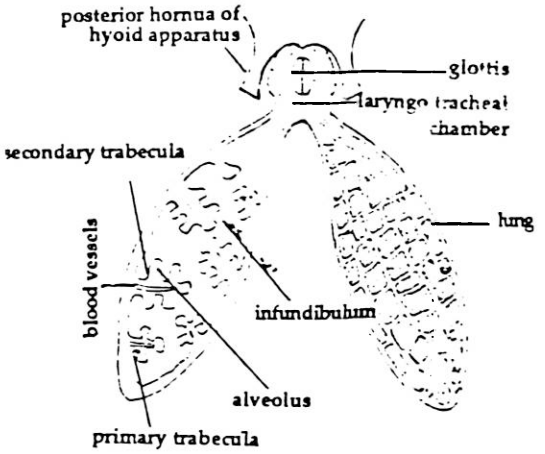
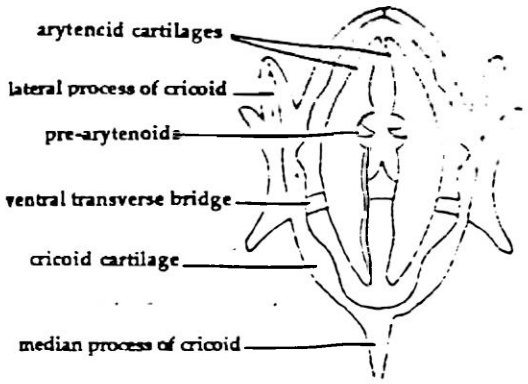
Describe the sound producing organ in frog ?

Ans: 1. The sound producing organ in frog is laryngo-tracheal chamber.
2. It is supported by five cartilagenous structures namely a ring like cricoid and a pair of semi-circular arytenoids and a pair of pre-arytenoids.
3. A pair of vocal cords stretch across the voice box which produce sound due to their vibration.

4 U

In frog, CO_2 is liberated and diffused into the blood. Explain how this CO_2 is sent out ?

Ans: CO_2 released during cellular respiration is transported outside through three forms. They are:
1. As carbonic acid in plasma
$$CO_2 + H_2O \text{ ----> } H_2CO_3$$
2. As carbamino compounds
3. As unstable carbonic acid through RBC
$$CO_2 + H_2O \text{ -----> } H_2CO_3 \text{ -----> } H^+ + HCO_3^-$$

Q. No.	Obj.	Questions	Answers
5	A	In an experiment, a frog kept in a very small and tightly closed chamber with a lamp burning was found to be dead. Why ?	Ans: The frog was found dead in this experiment because 1. the insufficient oxygen causes an incomplete combustion of carbon and produces CO in the chamber. 2. As the frog inhales CO it combines with haemoglobin forming carboxy haemoglobin which is a stable compound. 3. Hence, the amount of haemoglobin for O_2 transport reduces causing the death of frog.
6	S	Draw a neat labelled sketch of lungs of frog ?	Ans: 
7	S	Draw a neat sketch of laryngo-tracheal chamber of frog and label it ?	Ans: 

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	U	Describe the structure of lungs in frog ?	Ans: A detailed account of structure of lungs should be given on the following lines. 1. A pair of thin walled oval and bag like structures present on in the thoracic cavity. 2. Connected with laryngotracheal chamber by short bronchus. 3. Surrounded by pleuroperitoneal layers. 4. The inner wall is thrown into a number of folds called primary trabeculae which in turn form secondary trabeculae. 5. The spaces between the primary trabeculae are infundibulae and those between the secondary trabeculae are called alveoli.
2	U	Explain the process of pulmonary respiration in frog ?	Ans: Includes two phases - inspiration and expiration. Inspiration an active process takes place in two phases. In the first phase, the air enters the buccopharyngeal cavity and in the second phase the air from buccal cavity goes into the lungs. Expiration a passive process also takes place in two phases. In the first phase air from lungs enters into the buccal cavity and in the second phase air from buccal cavity goes out. Recent experiments onthe mechanism of respiration.

TOPIC 7 : CIRCULATORY SYSTEM

CONTENT POINTS: Blood, heart, arterial, venous and portal systems.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	The artery can be distinguished from the vein in having A. thick wall with no valves B. more blood cells with valves C. impure blood only D. carrying blood to various parts	A
2	K	The blood platelets are the source of A. fibrinogen B. calcium C. thromboplastin D. haemoglobin	C
3	K	Pace maker of the heart is A. sinu auricular node B. bundle of His D. Purkinje's fibre	A
4	K	The lymphocytes protect from A. pathogens B. lymph C. leucocytes D. toxims	A

Q. No.	Obj.	Questions	Answers
5	K	Antibodies fight against A. infection B. thirst C. leucocytes D. toxims	A
6	U	The lymph differs from the blood in having A. blood with more RBC and less WBC B. blood without plasma C. plasma without proteins D. blood with no RBC but more WBC	D
7	U	Coagulation of blood in the vessels is prevented during normal conditions by A. prothrombin B. calcium C. plasmalogen D. heparin	D
8	A	Among the following arteries, which deoxygenated artery carries blood in frog during circulation. A. Renal artery B. Carotid artery C. Pulmonary artery D. Cardiac artery	C

Q. No.	Obj.	Questions	Answers
9	K	If blood cells from blood are removed, the liquid left is A. serum B. plasma C. almost water D. only haemoglobin	B
10	U	pH of blood in arteries and veins is A. same B. more in arteries C. more in veins D. more in arteries and less in veins	A
11	U	Which organ acts as barometer in frog ? A. Membranous labyrinth B. Bony labyrinth C. Carotid labyrinth D. Pituitary gland	C
12	K	The right auricle of frog receives A. impure blood B. mixed blood C. pure blood D. none	C
13	U	Oxygenated blood from lungs is carried to the heart by A. cardiac vein B. pulmonary veins C. pulmonary arteries D. jugular vein	B

Q. No.	Obj.	Questions	Answers
14	U	Which part in the heart of frog is responsible for the contraction ? A. Semi-auricular node B. Bundle of His C. Chordac tendinae D. Spiral valve	A
15	K	The truncus arteriosus in frog on each side gives rise A. six branches B. two branches C. four branches D. three branches	D
16	K	The auricles of frog are A. incompletely divided B. not divided C. divided by trabeculae D. divided by inter-auricular septum	D
17	K	Iliac artery carries blood to A. fore limbs B. hind limbs C. stomach D. kidney	B
18	K	Carotid trunk supplies the blood to A. fore limbs B. thorasic region C. abdomen D. head	D

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	K	The pulse rate is measured in an_____.	Artery
2	K	The number of semilunar valves in the heart of frog is_____.	six
3	K	The erythropoietic organ in adult frog is_____.	spleen
4	K	The vein with mixed blood is_____.	musculo-cutaneous
5	K	Blood leaving liver and moving to the heart has substantially high concentration of_____.	urea
6	K	Urea is transported by_____.	blood and plasma
7	U	The chief difference between the erythrocytes of man and frog is_____.	that human RBC have no nuclei
8	U	The renal portal system in frog is significant for_____.	elimination of nitrogenous wastes in kidneys
9	K	Sciatic vein in frog pours blood into _____.	renal portal vein
10	K	Bundle of His is found in_____.	heart
11	K	_____ carries oxygenated blood from the lungs to the heart.	Pulmonary vein
12	U	Poikilotheronic animals are those in which_____.	temperature of body changes with surroundings
13	K	A blood clot inside a blood vessel is known as_____.	thrombosis

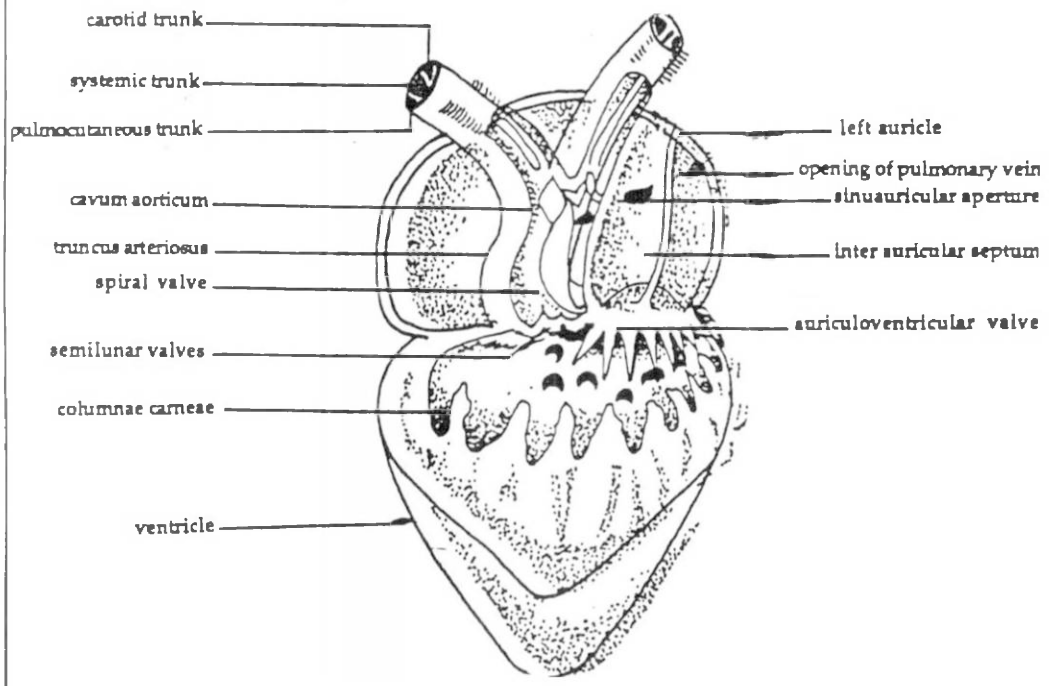
Q. No.	Obj.	Questions		Answers
MATCH THE FOLLOWING				
		A	B	
1	K	1. Liver	a. Produces RBC, WBC and thrombocytes	1-d
	K	2. Heart	in adult frog	2-e
	U	3. Spleen	b. Performs cutaneous respiration in frog	3-a
	U	4. Skin		4-b
	U	5. Kidney	c. Renal portal system associates with it.	5-c
			d. Produces heparin	
			e. Incompletely four chambered in reptiles	
SHORT QUESTIONS				
1	K	Name the necessary vitamin for the clotting of blood ?		Vitamin K
2	K	What is the life span of an erythrocyte in frog ?		100 days
3	U	Name the blood cells that increase at the time of allergy and infection.		Acidophils
4	K	What are the inner projections of the wall of the ventricle in the heart of frog ?		Columnae corneae
5	K	From which aortic arch the coeliaco mesentric artery arises ?		Left systemic
6	K	What is the pH of blood plasma ?		7.2 to 7.6
7	K	Which type of white blood cells are abundant in blood ?		Neutrophils
8	U	Why monocytes in the blood of frog are called internal scavengers ?		they remove wornout and dead cells

Q. No.	Obj.	Questions	Answers
9	U	What type of blood is circulated to the various organs of the body of frog in the light of recent experiments ?	Mixed blood
10	U	What are the structures that increases the oxygen consumption of the wall of ventricle ?	Columnae carneae
11	U	In what way the pulmonary and cutaneous arteries are different from other arteries ?	They are the only arteries carrying deoxygenated blood
12	A	What happens if the pace maker of heart in frog is removed or damaged ? Ans: Failure of generation of cardiac impulses occur, heart beats become abnormally slow and ventricle fails to pump the blood.	
13	A	What happens if RBC are placed in hypertonic solution ? Ans: The wall of RBC shrink due to exosmosis.	
14	U	When the frog is injected with harmful germs it has to suffer with a disease, but some of the cells in the blood kill these germs and protect the animal. What are those cells ?	White blood corpuscles/ leucocytes
15	A	In an experiment a radioactive substance is injected into pulmonary vein. In which branch of truncus arteriosus do you find this radioactive substance first ?	All the three aortic arches simultaneously
SHORT ANSWERS			
1	U	Write the composition of blood in frog? Ans:1. Plasma and its constituents 2. RBC 3. WBC and various types among them 4. Thrombocytes	

Q. No.	Obj.	Questions	Answers
2	U	Which is called 'the red river of the body' in frog ? Give any four main functions of it.	Ans: 1. The blood is called the red river of the body in frog. 2. Four main functions of blood A. Transports digested food materials B. Transports respiratory gases C. Removes excretory wastes D. Protects the body from the microbes E. Helps in clotting
3	U	Which is the largest blood vessel in the body of frog ? Describe its structure ?	Ans: Truncus arteriosus is the largest blood vessel in frog. Description of the truncus arteriosus has to be written with reference to the following parts. 1. Pylangium 2. Synangium 3. Spiral valve 4. Aortic arches
4	U	Which is the thick walled chamber in the heart of frog ? Explain its structure ?	Ans: 1. The ventricle is the thick walled structure in the heart of frog. 2. Auriculo ventricular septum, Auriculo ventricular aperture, Auriculo ventricular valves 3. Chordae tendinae and columnae carmeae have to be described
5	U	Explain the dorsal aorta and the branches that arise from it ?	Ans: 1. The right systemic arch forms the dorsal aorta. 2. It gives off four to six pairs of renal arteries. From the first pair gonadial arteries arise. 3. Posteriorly it gives off two iliacs. 4. Each iliac artery gives vesiculo epigastric, femoral and sciatic arteries.

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	K	Describe the composition and functions of blood in frog ? Ans: 1. It is a fluid tissue consists plasma and blood corpuscles. 2. Plasma is a ground substance containing various organic and inorganic substances. 3. Red blood corpuscles. 4. White blood corpuscles and their different kinds. 5. Thrombocytes 6. Functions of blood	
2	K	Give a detailed account of the structure of heart in frog ? Ans: 1. External structure of heart 2. Sinus venosus 3. Right and left auricles 4. Ventricle 5. Truncus arteriosus	
3	K	What is heart beat ? Explain how the heart works in frog. Ans: 1. Heart beat-systole and diastole 2. Brucke's classical theory 3. Initiation of contraction by sinus-auricular node and contraction of sinus venosus. 4. Auricular contraction 5. Ventricular contraction 6. Differential distribution and modern experiments	
4	U	What is meant by portal system ? Explain it with reference to frog. Ans: 1. Definition of portal system 2. Renal portal system 3. Significance of renal portal system 4. Hepatic portal system 5. Importance of hepatic portal system	

Q. No.	Obj.	Questions	Answers
5	U	Explain the system of blood vessels which carry blood to different parts of the body in frog ? Ans: Description of the following blood vessles of arterial system in frog has to be written. 1. Truncus arteriosus 2. Aortic arches 3. Carotid arch and its branches 4. Systemic arch and its branches 5. Pulmo-cutaneous and its branches	
6	U	Describe the venous system of frog in detail ? Ans: 1. Formation of pre-caval veins 2. Formation of post-caval veins 3. Sinus venosus 4. Renal portal system and its significance 5. Hepatic portal system and its significance.	
7	S	Draw a neat labelled diagram of heart of frog.	



TOPIC 8 : NERVOUS SYSTEM AND ENDOCRINE SYSTEM

CONTENT POINTS:

1. Brain, nerve cord, cranial and spinal nerves and different hormones
2. Parts of nervous system - Central nervous system, peripheral nervous system and autonomous nervous system.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The outermost layer of the brain	B
		A. Piamater	
		B. Duramater	
		C. Both	
		D. None	
2	U	If cerebral hemispheres of frog are removed, it	C
		A. Dies immediately	
		B. Stops feeding	
		C. Dies after some time	
		D. Behaves normally	
3	K	The second cranial herve of frog is	A
		A. optic	
		B. trigeminal	
		C. abducens	
		D. olfactory	
4	U	Large number of nerve cells are found in	A
		A. Retina	
		B. Tongue	
		C. Spinal cord	
		D. Brain	

Q. No.	Obj.	Questions	Answers
5	U	Which one of the following is responsible for the control of reflex actions ? A. Central nervous system B. Motor nerves C. Sensory nerves D. Sympathetic nervous system	A
6	K	The thermo-regulatory centre of the body is in A. spinal cord B. hypothalamus C. pitutary D. cerebellum	B
7	K	Nervous system develops from A. endoderm B. mesoderm C. ectoderm D. endomesoderm	C
8	K	Rhinocoel is the cavity of A. medulla oblongata B. olfactorylobe C. cerebral hemispheres D. optic lobes	B
9	K	The fourth ventricle lies in A. medulla oblongata B. cerebellum C. spinal cord D. optic lobe	A

Q. No.	Obj.	Questions	Answers
10	K	Vagus nerve is A. motor B. mixed C. sensory D. none	B
11	A	The frog looses sight if one of the following is removed A. Diencpehalon B. Cerebellum C. Medulla oblongata D. Cerebral hemispheres	A
12	K	Which one of the following is purely motor nerve. A. Olfactory B. Trigeminal C. Vagus D. Abducens	A
13	K	The longest cranial nerve is A. pathetic B. facial C. hypoglossal D. vagus	D
14	K	Most of the reflex actions are under the control of A. brain B. spinal cord C. cranial nerves D. spinal nerves	B

Q. No.	Obj.	Questions	Answers
15	U	The longest cell in the vertebrate body is A. muscle cell B. nerve cell C. bone cell D. none	B
16	K	The change of colour in frog is A. nervous effect B. hormonal effect C. both D. none	C
17	K	Colour of skin of tadpole larva of frog is changed accordingly to that of surroundings by A. intermedin B. metatomin C. advenalin D. thyroxine	B
18	K	Which of the following is partly exocrine nad partly endocrine. A. Pituitary B. Pancreas C. Thyroid D. Thymus	B

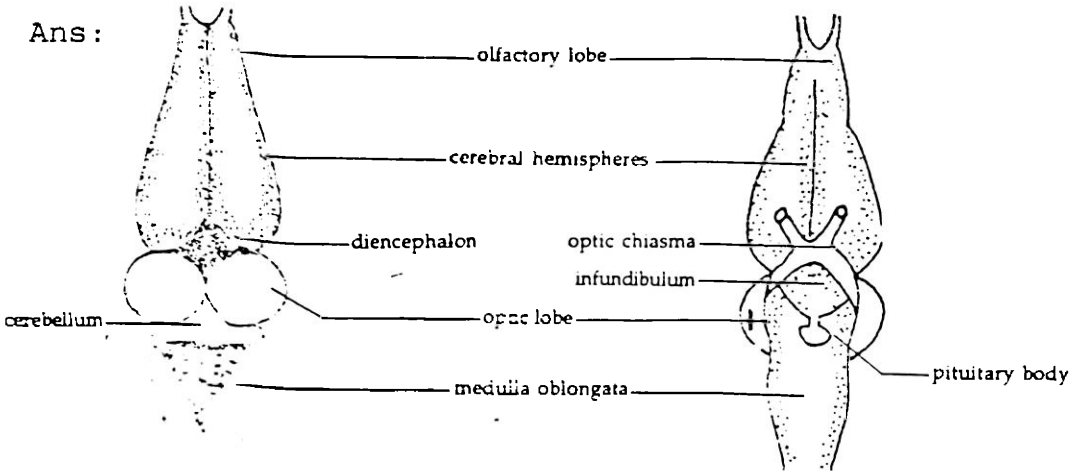
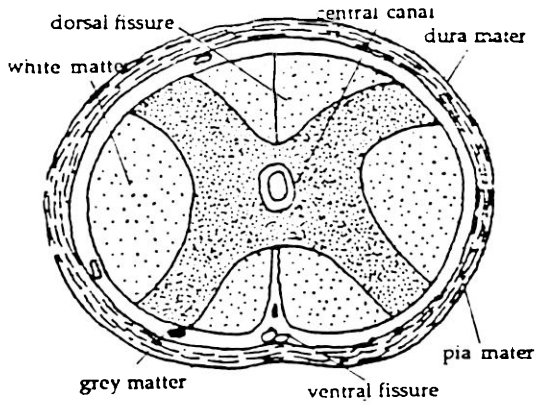
Q. No.	Obj.	Questions	Answers
19	K	The tapering filament of spinal cord in frog is called A. Neuron B. Motor nerve C. Filum terminale D. Sensory nerve	C
20	K	Axon has neurilemma which is made up of A. muscle cells B. epithelial cells C. fibroblast cells D. Schwann's cells	D
FILL IN THE BLANKS			
1	K	Polar neurons are found in_____.	Hydra
2	U	Nerve impulse is formed by_____.	Electro-chemical changes
3	K	Pituitary gland is under the control of _____.	Hypo-thalamus
4	K	Insulin is produced by_____.	a hormone
5	A	If thyroid is removed from a tadpole larva_____. Ans: it does not undergo metamorphosis and remain tadpole throughout life.	

Q. No.	Obj.	Questions	Answers
MATCH THE		FOLLOWING	
1	K	Match the following glands with the hormones secreted by them.	
		1. Pituitary — a. Glucagon	1-c
		2. Thyroid — b. Testosterone	2-d
		3. Adrenal — c. Oxytocin	3-e
		4. Pancreas — d. Thyroxine	4-a
		5. Gonads — e. Epinephrine	5-b
2	U	Match the following hormones with their respective functions.	
		1. STH — a. Acts as a vasso dilator in brain, cardiac muscles, liver, etc.	1-d
		2. Thyroxine	2-e
		3. Parathormone — b. Maintains Ca^{++} level in blood	3-b
		4. Adrenaline — c. Increases blood sugar level	4-a
		5. Glucagon — d. Controls over all growth of body	5-c
		e. Controls metamorphosis in larva of amphibians	
3	K	Match the following	
		1. Ist cranial nerve — a. Trigeminal	1-c
		2. IIIrd cranial nerve — b. Glossopharyngeal	2-d
		3. Vth cranial nerve — c. Olfactory	3-a
		4. VIth cranial nerve — d. Occulomotor	4-e
		5. IXth cranial nerve — e. Abducens	5-b

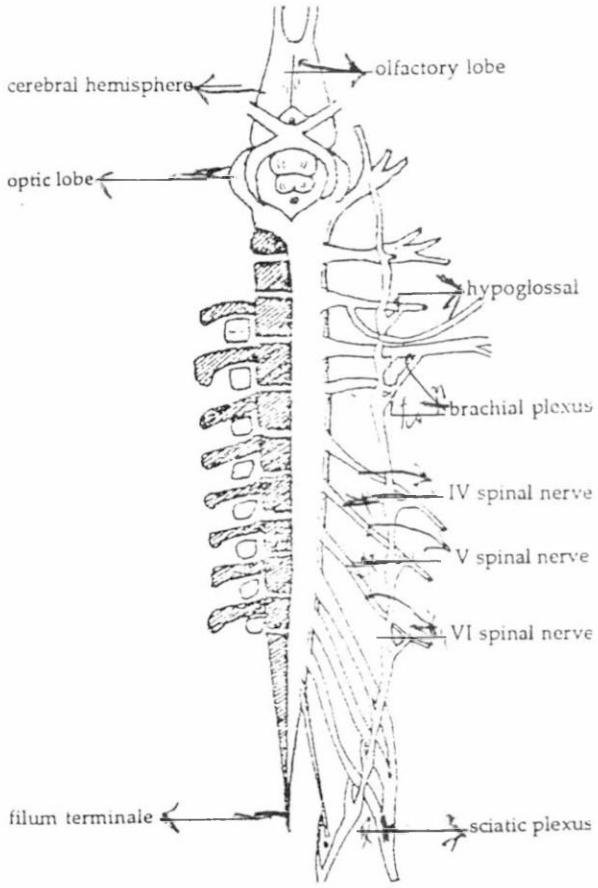
Q. No.	Obj.	Questions		Answers
4	K	Match the following		
		1. Optic	a. Mixed nerve	1-c
		2. Trochlear	b. Immervates internal ear	2-e
		3. Facial	c. Sensory nerve	3-d
		4. Auditory	d. Gives rise five branches	4-b
		5. Vagus	e. Motor nerve	5-a
SHORT QUESTIONS				
1	K	How many pairs of cranial nerves are present in snakes ?		Ten pairs
2	K	Which type of cranial nerve is trigeminal ?		Mixed nerve
3	K	Which is the longest cranial nerve ?		Vagus nerve
4	K	Which is the smallest cranial nerve ?		Abducens
5	K	Which is the nerve that is concerned with sense of smell ?		Olfactory nerve
6	K	How many pairs of spinal nerves are present iin man ?		31 pairs
7	K	What are the spinal nerves that form brachial plexus in frog ?		Ist, IInd & IIIrd spinal nerves
8	K	How many pairs of spinal nerves are present in <u>Rana tigrina</u> ?		9 pairs
9	U	What is the hormone responsible for colour changes in frog ?		MSH or intermedian
10	K	Which endocrinal gland is the largest and endodermal in origin ?		Thyroid gland
11	K	Which hormone controls the calcium level in blood ?		Parathormone
12	K	Which hormone is described as 'fight or flight hormone' in frog ?		Adrenaline/ Epinephrine
13	U	Which gland acts as both exocrine and endocrine gland ?		Pancreas

Q. No.	Obj.	Questions	Answers
SHORT ANSWERS			
1	U	Describe the prosen-cephalon of brain in frog ?	Ans: Description of forebrain should be given with emphasis on the following parts: 1. Olfactory lobes 2. Cerebral hemispheres 3. Diencephalon
2	U	Where do you find the third ventricle in the brain of frog ? Describe it in detail ?	Ans: It is found in the diencephalon of frog on account of the following parts have to be given. 1. Anterior choroid plexus 2. Pineal stalk 3. Pituitary body and 4. Optic chiasma
3	A	If medulla oblongata is removed from the brain of frog what happens ? Substanciate your answer with reasons ?	Ans: Removal of medulla oblongata causes death of frog because it controls the main involuntary functions such as: 1. Heart beat 2. Respiration 3. Digestion
4	U	List out the functions of brain in frog?	Ans: Brain is the centre for control and co-ordination of all vital activities. The different parts of the brain carryout different functions and are as follows: 1. Optic lobes - centres of smell. 2. Cerebral hemispheres - centres of consciousness, intelligence, memory and voluntary actions. 3. Diencephalon - Controls matabolism, and plays role in vision. 4. Optic lobes - centres for sight and control muscles of eye. 5. Cerebellum - maintains body equilibrium. 6. medulla oblongata - centre for heart beat, respiration, digestion, etc.

Q. No.	Obj.	Questions Answers
5	U	The spinal cord is the second part of central nervous system. Description of the following parts has to be given: 1. Meninges, 2. Filum terminale, 3. Central canal, 4. Grey matter, 5. White matter and 6. Dorsal and ventral horns.
6	U	How many pairs of cranial nerves are present in frog and identify them according to their function ? Ans: In frog there are ten pairs of cranial nerves. They are: 1. Olfactory - Sensory nerve 2. Optic - Sensory nerve 3. Occulomotor - Motor nerve 4. Pathetic - Motor nerve 5. Trigeminal - Mixed nerve 6. Abducens - Motor 7. Facial - Mixed 8. Auditory - Sensory 9. Glossopharyngeal - Mixed 10. Vagus - Mixed
7	U	Describe the spinal nerves of frog briefly ? Ans: 1. There are ten pairs of spinal nerves in frog but in some species only nine pairs are present. 2. Brachial plexus is formed by Ist, IInd and IIIrd spinal nerves. 3. Sciatic plexus is formed by VIIth, VIIIth, IXth and Xth spinal nerves.
LONG ANSWERS		
1	U	Describe the brain of frog and add a note on its functions ? Ans: Description of brain has to be given with emphasis on the following: 1. Forebrain 2. Midbrain 3. Hindbrain 4. Cavities of the brain 5. Functions of brain

Q. No.	Obj.	Questions	Answers
2	S	Draw a neat labelled diagram of brain of frog ?	Ans: 
3	S	Draw a neat diagram of T.S. spinal cord of frog and correctly label it ?	Ans: 
4	S	Draw a sketch showing the spinal nerves of frog and properly label it ?	Ans:

PTO


cerebral hemisphere
olfactory lobe
optic lobe
hypoglossal
brachial plexus
IV spinal nerve
V spinal nerve
VI spinal nerve
filum terminale
sciatic plexus

TOPIC 9 : URINOGENITAL SYSTEM

CONTENT POINTS:

1. Excretory system and physiology of excretion, male and female reproductive systems.
2. In vertebrates like frog, the excretory system is closely associated with reproductive system. Therefore, these two systems are collectively described as urinogenital system.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	Urea is transported by A. plasma B. blood C. RBC D. WBC	A
2	K	Loop of Henle is concerned with A. excretory system B. nervous system C. muscular system D. reproductive system	A
3	K	The conversion of ammonia into urea occurs in A. kidneys B. liver C. lungs D. pancreas	B

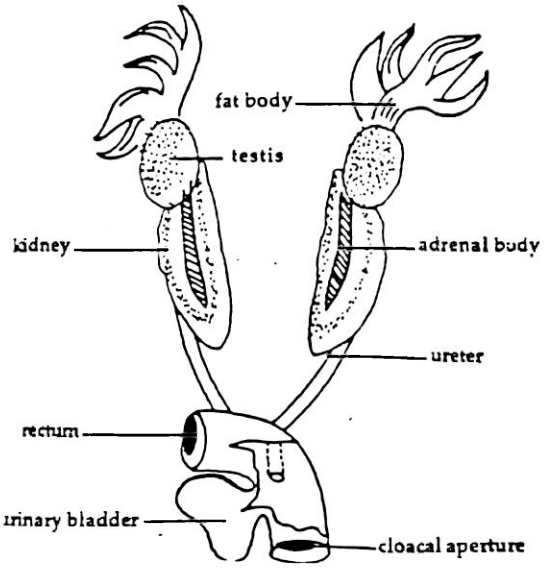
Q. No.	Obj.	Questions	Answers
4	K	Ammonia is the chief nitrogenous excretory material in A. reptiles B. turtles C. tadpoles D. amphibians	C
5	K	The structural and functional unit of vertebrate kidney is A. nephridium B. uriniferous tubule C. ureter D. nephron	D
6	U	The kidneys resemble the contractile vacuoles of protozoan in A. expelling out excess of water B. expelling out amino acids C. expelling out urea and uric acid D. expelling out salts	A
7	U	Separation of amino acid into amino and carboxyl groups is known as A. excretion B. deamination C. amination D. egestion	B

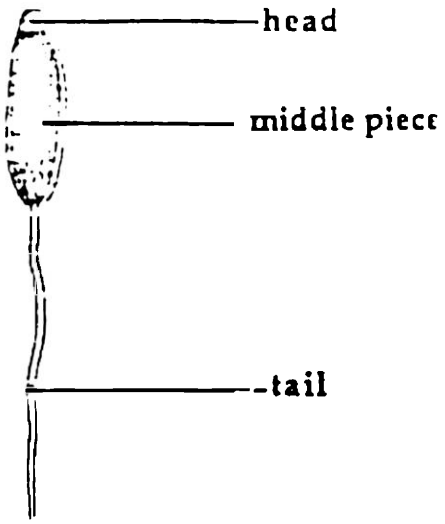
Q. No.	Obj.	Questions	Answers
8	K	In man and mammals, the urea is mainly produced in A. kidney B. liver C. spleen D. urinary bladder	B
9	K	The chief nitrogenous waste in urine of rabbit or terrestrial mammal is A. uric acid B. ammonia C. urea D. all	C
10	K	The term urine can first be used in A. Bowman's capsule B. loop of Henle C. urinary bladder D. collecting tubule	D
11	A	A condition in which urea contained in blood is A. haematuria B. diabetes C. anuria D. ketonuria	A
12	K	A condition of failure of kidney to form urine is A. haematuria B. ketomuria C. anuria D. diabetes	C

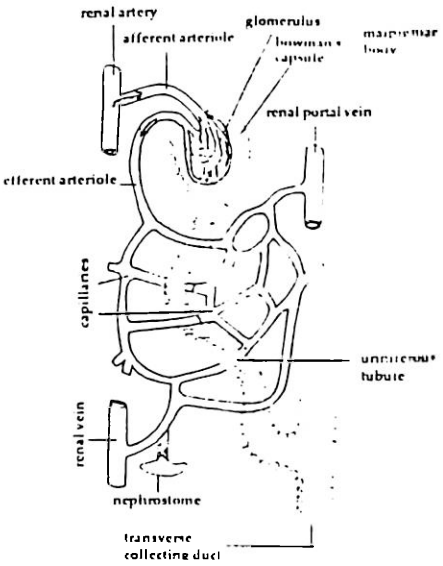
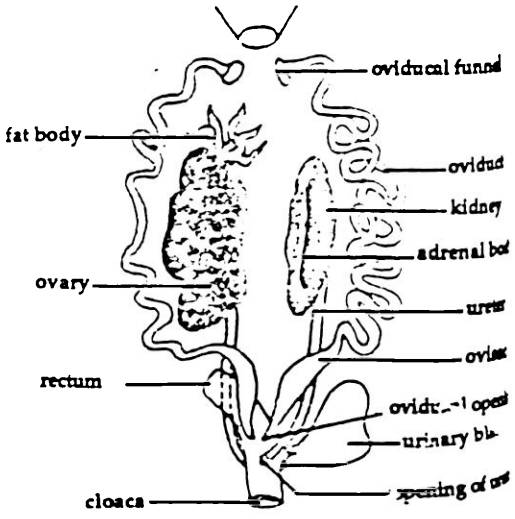
Q. No.	Obj.	Questions	Answers
13	K	The bidder's canal helps to pass out A. ova B. sperms C. bile D. saliva	B
14	K	Based on the distribution of yolk, the egg of frog is A. alecithal B. microlecithal C. telolecithal D. megalecithal	C
15	U	Least concentration of urea is present in A. renal artery B. renal vein C. post-canal D. dorsal aorta	B
16	K	The main excretory product of birds is A. urea B. ammonia C. amino acids D. uric acid	D
FILL IN THE BLANKS			
1	K	The human sperm was first seen and described by_____.	Hamm and Leauvenhook
2	K	Blood vascular system and excretory organs develop from_____.	Mesoderm

Q. No.	Obj.	Questions	Answers
3	K	The development of egg without fertilisation is parthenogenesis. It occurs in some_____.	Honey bee & some helminths
4	U	The third cleavage in frog's development is_____.	Holoblastic, transverse & unequal
5	K	In male frog the testes are attached to kidney by_____.	Mesarchium
6	K	Vasa efferentia of frog are found in _____.	between testes and kidney
7	K	Toads belongs to the family_____.	Bufonidae
MATCH THE FOLLOWING			
1	U	A — B	
		1. Fishes — a. Henle's loop	1-c
		2. Mammals — b. Uric acid	2-a
		3. Reptiles — c. Ammonia	3-b
		4. Amphibians — d. Only left ovary present	4-e
		5. Aves — e. Urea	5-d
2	K	A — B	
		1. Prototheria — a. Placenta	1-c
		2. Anura — b. Pouched mammals	2-d
		3. Urodela — c. Gynaecomastism	3-e
		4. Marsupialia — d. Tadpole larva	4-b
		5. Eutheria — e. Paedogenesis	5-a
SHORT ANSWER QUESTIONS			
1	K	What is the functional kidney of tadpole larva ?	Pronephric kidney

Q. No.	Obj.	Questions	Answers
2	K	Which type of epithelium lines the Bowman's capsule ?	Squamous epithelium
3	K	What is the enzyme required for the production of urea ?	Arginase
4	K	What is the term coined for the filteration of blood in the Bowman's capsule ?	Glomerular ultra-filtration
5	U	Why urine is yellow in colour ?	Due to the presence of urochrome
6	K	What are the structural and functional units of kidney ?	Nephrons
7	U	What is the adaptation of aquatic animals with reference to excretion ?	Excretion of ammonia as nitrogenous waste
8	U	What factor is responsible for glomerular filtration ?	Hydrostatic pressure in glomerulus
9	A	What happens if the bidder's canal present on the inner margin of kidney is removed ?	The sperms produced in testes cannot enter ureter
10	A	If the urinogenital ducts in male frog are removed,which function is impaired?	Urine and sperms cannot pass out
11	K	Which organella of a cell constitutes acrosome in spermatozoa ?	Golgi body
12	U	How do you identify a male frog during the breeding season ?	With the help of vocal sacs and nuptial pads
13	K	Name the mass of eggs released into the water by a female frog ?	Frog spawn
14	U	From which embryonic structure the vertebral column of frog develops ?	Notochord

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	U	What is the structural and functional unit of kidney ? Describe it briefly ?	Ans: 1. The structural and functonal unit of kidney is Nephron. It consists mainly two parts namely: (1) malphigean body and (b) uriniferous tubule. 2. Malphigean body consists of Bowman's capsule and glamerulus. 3. Uriniferous tubule in its turn divided into four parts and finally opens into collecting tubule.
2	U	Describe how urine is formed in frog ?	Ans: The excretion of nitrogenous wastes in frog involves three processes. They are: 1. Glomerular ultrafiltration 2. Selective reabsorption 3. Tubular secretion
3	U	Describe the structure of sperm in frog ?	Ans: The sperm of frog consists of three parts namely: 1. Head, 2. Middle piece and 3. Tail.
4	S	Draw a neat diagram of urinogenital system of male frog and label it.	Ans: 

Q. No.	Obj.	Questions Answers
5	S	Draw a neat labelled sketch of spermatozoan of frog ? Ans: 
6	U	Describe the excretory system of frog ? Ans: The excretory system of frog consists - 1. a pair of kidneys, 2. a pair of ureters, and 3. urinary bladder Each kidney is formed of a number nephrons. Each nephron consists two parts namely: 4. Malphigean body and 5. Uriniferous tubule
7	U	Explain the process of excretion in frog ? Ans: The process of excretion in frog takes place by 1. Hydrostatic pressure of blood 2. Ultrafiltration of blood in glomerulus 3. Selective reabsorption of certain useful salts and water through the walls of uriniferous tubule. 4. Tubular secretion of waste products by the uriniferous tubule and 5. Formation of urine due to increased concentration of urea and expelsion of urine through ureters, urinary bladder and cloaca.

Q. No.	Obj.	Questions	Answers
8	S	Draw a neat sketch of nephron of frog and correctly label it ?	Ans: 
9	S	Draw a neat labelled sketch of female reproductive of frog ?	Ans: 

TOPIC 10 : FROG - DEVELOPMENT AND LIFE-HISTORY

CONTENT POINTS: Cleavage, Blastulation, Gastrulation, Primary germ layers, Tadpole larva and Metamorphosis

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	In frog gastrulation is completed by A. emboly B. epiboly C. both D. none	C
2	K	The larva of frog is A. aquatic B. terrestrial C. amphibians D. fossorian	A
3	K	In tadpole larva the intestine is A. curved B. coiled C. straight D. U-shaped	B
4	U	The tadpole larva of frog in its last stage respires with the help of A. gills and lungs B. gills C. lungs D. skin	A

Q. No.	Obj.	Questions	Answers
5	A	If an unfertilised frog's egg is pricked with a micro needle, it will A. die immediately B. start dividing C. remain undivided D. transform into a tadpole at a faster rate	B
6	K	Grey crescent is present in A. zygote of frog B. retina of crockroach C. eye of frog D. brain of rabbit	A
7	K	In the development of frog, the blastopore forms the future A. mouth B. anus C. tympanum D. nares	B
8	K	In frog's egg the division is A. holoblastic B. meroblastic C. diploblastic D. triploblastic	A

Q. No.	Obj.	Questions	Answers
9	K	In the life history of frog, the larva is a stage which A. resembles frog B. remains on land C. grows in the womb D. is different in structure and behaviour from adult	D
10	K	The region where sperm enters the egg is called A. animal pole B. receptive cone C. vegetal pole D. equator	B
FILL IN THE BLANKS			
1	K	The formation of notochord takes place by_____.	Mesoderm
2	K	The central nervous system develops as a result of_____.	Neurulation
3	K	The skeleton and muscles originate in the development from_____.	Mesoderm
4	K	Ontogenically liver and pancreas are _____.	Endodermal in origin
5	K	The respiration in tadpole is by _____.	gills
6	U	If a tadpole does not metamorphose and remains tadpole even then we cannot include it in pisces due to_____.	absence of scales
7	U	The holoblastic and equal cleavage in the embryo of frog ends at_____.	second cleavage
8	U	The third cleavage in frog's development is_____.	holoblastic and unequal

Q. No.	Obj.	Questions	Answers
9	K	The fertilisation in frog is_____.	external
10	K	Morula develops into_____.	blastula
11	U	The three germ layers are formed at the end of_____.	gastrula
12	K	A tadpole is_____ in its food habit.	herbivorous
13	K	A tadpole of frog has feathery external gills. Their number is_____.	three pairs
14	U	The tadpole larva is herbivorous in its food habit. Hence, it has a_____.	coiled and elongated intestine
15	U	The tadpole does not undergo metamorphosis is in the absence of_____ hormone.	thyroxine
16	K	In frog's egg the yolk is concentrated at the vegetal pole. So,it is described as_____.	telolecithal
17	K	With regard to yolk, the eggs of reptiles and birds are described as _____.	megalecithal
18	K	In Eutherians the yolk material is almost absent and hence the eggs are described as_____.	alecithal
19	K	The eggs of frog are described as mesolecithal because_____.	they contain moderate quantity of yolk material
20	U	_____ is regarded as the power house of spermatozoa.	Middle piece

Q. No.	Obj.	Questions	Answers
MATCH THE FOLLOWING			
1	U	Match the following groups A — B 1. Amura — a. Neoteny 2. Reptilia — b. Bisexual 3. Eutheria — c. Mesolecithal and telolecithal 4. Urodela — d. Megalecithal 5. Annelida — e. Alecithal	1-c 2-d 3-e 4-a 5-b
VERY SHORT ANSWER			
1	U	Which inorganic substance has to be added to pond water to accelerate the metamorphosis in frog tadpoles ?	Iodine
2	U	Name the process of sexual embracement between male and female frogs.	Amplexus or pseudo-copulation
3	K	With regard to yolk material, the eggs of frog are called	telolecithal and mesolecithal
4	K	What is the mass of sperms liberated into the water ?	Frog milt
5	U	Name the germ layers that develop the sense organs during the development of frog.	Ectoderm and mesoderm
6	K	Name the cavity of gastrula	Archenteron
7	A	What is the organ that develops first during embryogenesis ?	Notochord
8	U	How many cleavages are completed in 16-celled stage of frog's embryo ?	Four cleavages

Q. No.	Obj.	Questions	Answers
9	K	What is the male hormone that brings about development of secondary sexual characters and behavioural changes ?	Testosterone
10	U	How spermatozoa are provided with energy for their movements ?	Mitochondria present in middle piece of sperm
11	K	What is the term used to indicate the release of matured ova into the coelome by the rupture of wall of ovary ?	Ovulation
12	U	What are the components produced from one oogonium ?	One ovum & 3 polar bodies
13	U	What are the changes that occur during metamorphosis of frog ?	Structural, anatomical & physiological
14	A	When the thyroid gland is removed from tadpole of frog, it cannot metamorphose. When it can metamorphose ? Ans: It can metamorphose when the injection of thyroxine is given.	
15	A	What happens if thyroxine secretion is stopped or if the water is poor in iodine in which tadpole larva is present ?	Metamorphosis will cease
SHORT ANSWER			
1	U	Describe the clearage in frog ? Ans: The division of the zygote is called cleavage. 1. First division - vertical and equal 2. Second division - also vertical and equal 3. Third division - horizontal and unequal	

Q. No.	Obj.	Questions	Answers
2	U	What is meant by gastrulation ? Explain how it takes place in frog ? Ans: The process of formation of the gastrula from blastula is known as gastrulation. It includes: 1. Epiboly 2. Invagination 3. Involution and 4. Delamination in which the cells are reorganised and rearranged to form three germ layers	
3	U	Describe the structure of tadpole larva when it is hatched out from fertilised egg ? Ans: The larva of frog hatched from the egg is called tadpole. It consists of 1. a large head 2. trunk and 3. short tail	
4	U	Define metamorphosis and explain it with reference to frog ? Ans: The series of changes that takes place during the transformation of larva into adult is called meta-morphosis. It includes: 1. Morphological changes 2. Anatomical changes 3. Physiological changes	
LONG ANSWER			
1	U	Describe the development of zygote in frog upto gastrula stage ? Ans: The embryo develops into a fish-like tadpole larva which undergoes metamorphosis to become into an adult. The zygote undergoes the following processes to reach the gastrula stage. 1. Cleavage 2. Blastulation 3. Gastrulation	

Q. No.	Obj.	Questions	Answers
		The gastrulation includes: 1. Epiboly 2. Invagination 3. Involution and 4. Delamination	
2	U	Describe the life-history of frog ? Ans: The life history of frog includes: 1. Egg stage: The fertilised eggs undergo cleavage due to sunlight and hatched out into a tadpole larva. 2. Larval stage: The larval stage in its turn has two stages namely: A) External gill stage and B) Internal gill stage. The larva undergoes metamorphosis that includes various morphological, anatomical and physiological to reach the third stage, i.e. 3. Adult stage.	

UNIT III : VERTEBRATE EMBRYOLOGY

TOPIC 11 : GAMETOGENESIS

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	Meiosis occurs in A. reproductive cells B. somatic cells C. vegetative cells D. sertoli cells	A
2	U	Spermatogonia are found in A. testis B. ovary C. kidney D. spleen	A
3	U	Oogonia are found in A. kidney B. testis C. ovary D. reproductive organs	C
4	U	The study of the development of animals and plants is called A. Ecology B. Physiology C. Embryology D. Morphology	C

Q. No.	Obj.	Questions	Answers
5	U	How many sperms are formed from each spermatogonium ? A. 2 B. 4 C. 8 D. 1	B
6	U	Which one of the following cells is having haploid number of chromosomes ? A. Primary spermatocytee B. Sperm mother cell C. Spermatid D. Sertoli cell	C
7	U	The length of the sperm of frog is A. 0.03 to 0.04 mm B. 0.02 to 0.03 mm C. 0.04 to 0.045 mm D. 0.01 to 0.03 mm	A
8	U	Polar bodies are formed during A. spermiogenesis B. spermatogenesis C. gamatogenesis D. oogenesis	D
9	U	How many eggs are formed from each oogonium ? A. 1 B. 2 C. 3 D. 4	A

Q. No.	Obj.	Questions	Answers
10	K	In Rana pipiens growth phase of oogenesis takes about A. 2 years B. 3 years C. 4 years D. 1 year	B
11	U	Which one of the following plays a vital role in the penetration of sperm into the egg ? A. Middle piece of sperm B. Head of sperm C. Tail of sperm D. Marchatte of sperm	B
FILL IN THE BLANKS			
1	K	The cylindrical sperm tubules making up the testis are called_____.	seminiferous tubules
2	U	The walls of the seminiferous tubules are lined with_____.	primordial germ cells
3	K	The resulting cells of the primordial germ cells after proliferation by mitotic division are called_____.	spermatogonia
4	K	Seminiferous tubules are found in _____.	testis
5	U	The acrosome of the sperm is formed from_____.	golgi bodies
6	U	The distal centriole gives rise to _____ of the sperm.	axial filament
7	U	_____ supply energy to the sperms.	Mitochondria
8	U	The acrosomal cavity of the sperm is called_____.	acrosomic vesicle
9	U	Growth phase plays a vital role in _____.	oogenesis

Q. No.	Obj.	Questions		Answers
MATCH THE		FOLLOWING		
	K	1. Golgi body	a. Maturation phase	1-c
	K	2. Centriole	b. Phosvitin	2-d
	K	3. Cytoplasm	c. Acrosome	3-e
	K	4. Haploid cell	d. Axial filament	4-g
	K	5. Nurse cell	e. Manchette	5-f
	U	6. Meiosis	f. Sertoli cell	6-a
	U	7. Yolk	g. Ootid	7-b
SHORT ANSWERS				
1	U	What is embryology ? Ans: Embryology is the study of the development of animals and plants.		
2	U	What are the different phases of development ? Ans: Gametogenesis, fertilisation, cleavage, gastrulation, organogenesis, growth and maturity.		
3	K	Define gametogenesis. Ans: The production of gametes is known as gametogenesis.		
4	K	Define spermatogenesis. Ans: The development of sperm in the testis is called spermatogenesis.		
5	K	Define oogenesis. Ans: The development of ovum in the ovary is called oogenesis.		
6	U	What are the three stages in the formation of spermatid ? Ans: 1. Multiplication phase 2. Growth phase 3. Maturation phase		
7	K	Name the two stages of spermatogenesis. Ans: 1. Formation of spermatids 2. Spermiogenesis		
8	K	Define spermiogenesis. Ans: The transformation of the spermatid into a mature spermatozoan is known as spermiogenesis.		

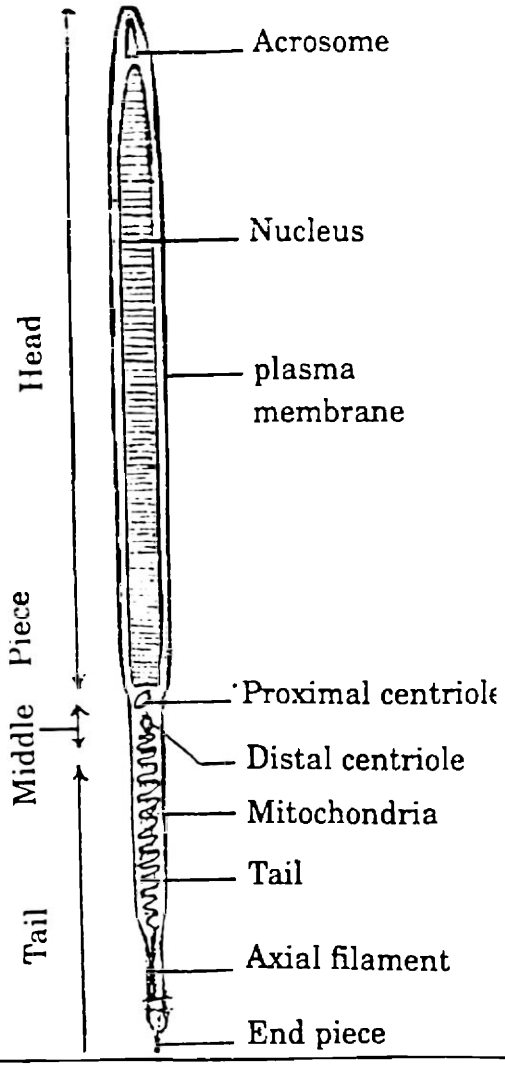
Q. No.	Obj.	Questions Answers
9	U	What are the two kinds of cells present in the epithelium of the testis ? Ans: 1. Sertoli cells 2. Germinal cells
10	U	What are sertoli cells ? Ans: The slender pyramidal cells nourishing the developing spermatozoa and the germinal cells are called sertolic cells.
11	U	Mention one difference between primary spermatocyte and secondary spermatocyte. Ans: Primary spermatocyte is a diploid cell whereas the secondary spermatocyte is a haploid cell.
12	K	What is manchette ? Ans: The abundant cytoplasm of the spematid is reduced to a condensed layer known as the manchette in sperm.
13	U	What are the three regions of a sperm ? Ans: (1) Head, (2) Middle piece and (3) Tail.
14	U	What is the difference between primary oocyte and secondary oocyte ? Ans: Primary oocyte having diploid number of chromosomes and secondary spermatocyte having haploid number of chromosomes.
15	K	Name the proteins found in yolk. Ans: 1. Phostilin 2. Lipovitellin
16	U	What are polar bodies ? Ans: Polar bodies are formed during oogenesis at the end of second meiotic division. They contian nothing but nuclei.
17	U	Write a note on growth phase of oogenesis. Ans: Nutritive substances and other materials necessary for the development of the embryo are synthesised. The oocyte increases in size.

Q. No.	Obj.	Questions	Answers
18	K	What are primary oocytes ?	
		Ans: When oogonia stop dividing mitotically then the cells are called primary oocyte.	
19	K	What are primary spermatocytes ?	
		Ans: When spermatogonia stop dividing mitotically then the cells are called primary spermatocytes.	
20	K	What are secondery spermatocytes ?	
		Ans: In maturation phase each primary spermatocyte undergoes first meiotic division and produces two equal sized cells known as secondary spermatocytes.	

LONG ANSWERS

1 S Draw the sperm of frog and label the parts.

Ans:



Q. No.	Obj.	Questions Answers
2	K	Describe the structure of sperm. Ans: 1. Divisions of sperm a. Head b. Middle piece c. Tail 2. Head - Nucleus and acrosome 3. Middle piece - Centrioles, Mitochondria and Axial filament 4. Tail - Main piece and end piece
3	K	Describe spermiogenesis. Ans: 1. Definition 2. Changes in the nucleus 3. Changes in the golgi bodies 4. Changes in the centrosome 5. Changes in mitochondria 6. Changes in cytoplasm

TOPIC 12 : TYPES OF VERTEBRATE EGGS

CONTENT POINTS : Shape and size - classification of eggs - types of eggs according to the amount of yolk - types of eggs according to the distribution of yolk - according to the type of development - according to the presence or absence of shell - egg membranes.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Mammalian eggs come under A. Alecithal B. Microlecithal C. Mesolecithal D. Macrolecithal	A
2	K	Birds egg comes under A. Isolecithal B. Telolecithal C. Centrolecithal D. Discoidal	D
3	U	The diameter of Ostrich egg mesaures about A. 0.07 mm B. 3.5 inches C. 50 u D. 2000 u	B
4	U	The largest size of the egg is A. egg of mouse B. egg of woman C. egg of ostrich D. egg of hen	C

Q. No.	Obj.	Questions	Answers
5	K	Eggs containing small amount of yolk are called A. Alecithal B. Microlecithal C. Mesolecithal D. Megalecithal	B
6	K	Concentration of yolk in the centre of the egg is called A. Isolecithal B. Telolecithal C. Centrolecithal D. Discoidal	C
7	K	Eggs with enormous amount of yolk are called A. Alecithal B. Microlecithal C. Mesolecithal D. Macrolecithal	D
8	K	Eggs with uniform distribution of yolk are called A. Isolecithal B. Telolecithal C. Centrolecithal D. Discoidal	A
9	U	Which of the following comes under secondary egg membrane ? A. Vitalline membrane B. Zona pellucida C. Corona radiata D. Albumen coat	C

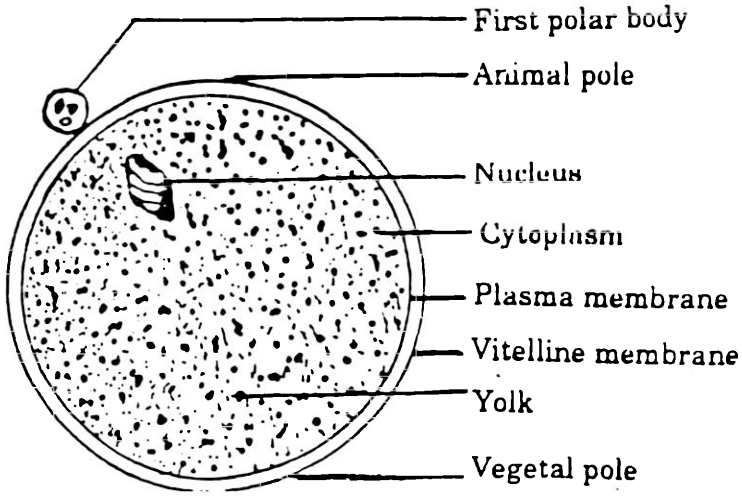
Q. No.	Obj.	Questions	Answers
10	U	The jelly envelope of the egg of sea urchin belongs to the type A. primary egg membrane B. secondary egg membrane C. tertiary egg membrane D. vitelline membrane	A
11	U	Albumen of hen's egg comes under A. primary egg membrane B. seconary egg membrane C. tertiary egg membrane D. none of the above	C
12	U	In mammals the layer of follicle cells surrounding the egg is called A. Zona radiata B. Corona radiata C. Theca externa D. Theca interna	B
13	U	Which of the following is termed as telolecithal ? A. Uniform distribution of yolk in the cytoplasm B. Unequal distribution of yolk with abundant at the vegetal pole than at the animal pole C. Concentration of yolk in the centre of the egg D. Enormous amount of yolk except blasto disc	B

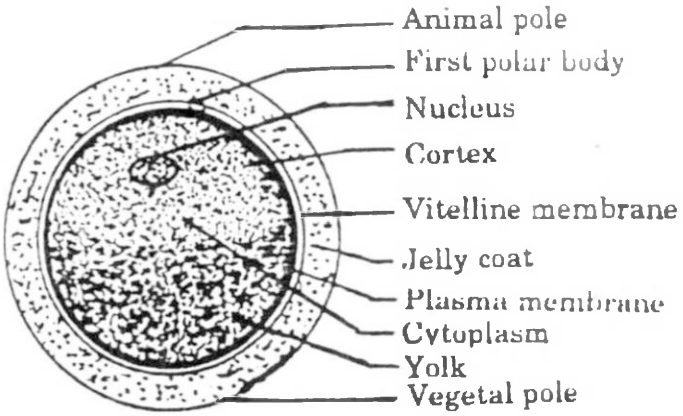
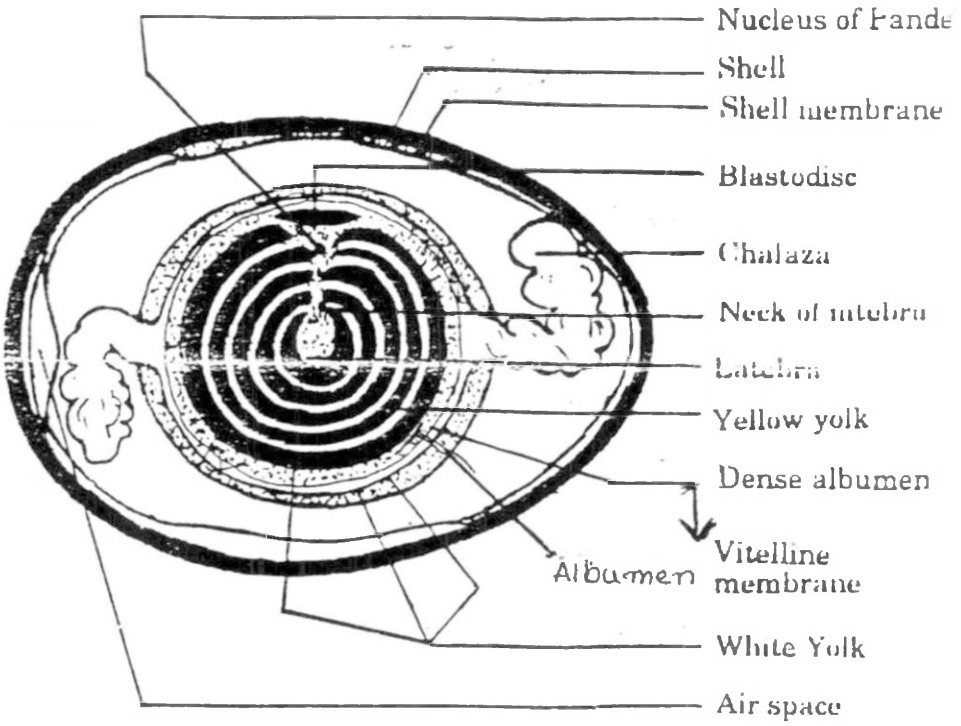
Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	K	The fully developed female sex cell is known as_____.	Ovum
2	U	The disc shaped area of cytoplasm in hen's egg is termed as_____.	blastodisc
3	K	Hen's egg is_____ in shape.	oval
4	K	Albumen coat of avian egg come under _____ membranes.	tertiary egg membranes
5	K	Primary egg membranes are formed by _____ itself.	ovum
6	K	The primary egg membrane of Amphioxus is_____.	vitelline membrane
7	U	The primary egg membrane of mammal is called_____.	Zona pellucida
8	U	The secondary egg membranes of mammals are_____ and_____.	theca and corona radiata
9	K	The secondary egg membrane of ascidian is_____.	chitinous shell
10	K	The outer most layer of a mature Graffian follicle is called_____.	Theca externa
11	K	In mammals the oocyte is surrounded by a striated membrane called_____.	Zona radiata
12	K	In mammals the zona radiata is replaced by an unstriated egg membrane called _____.	zona pellucida
13	K	In hen's egg the outer part of the latebra just beneath the blastodisc is known as_____.	nucleus of pander
14	K	The egg cortex contains membrane bound spherical bodies called_____.	cortical granules

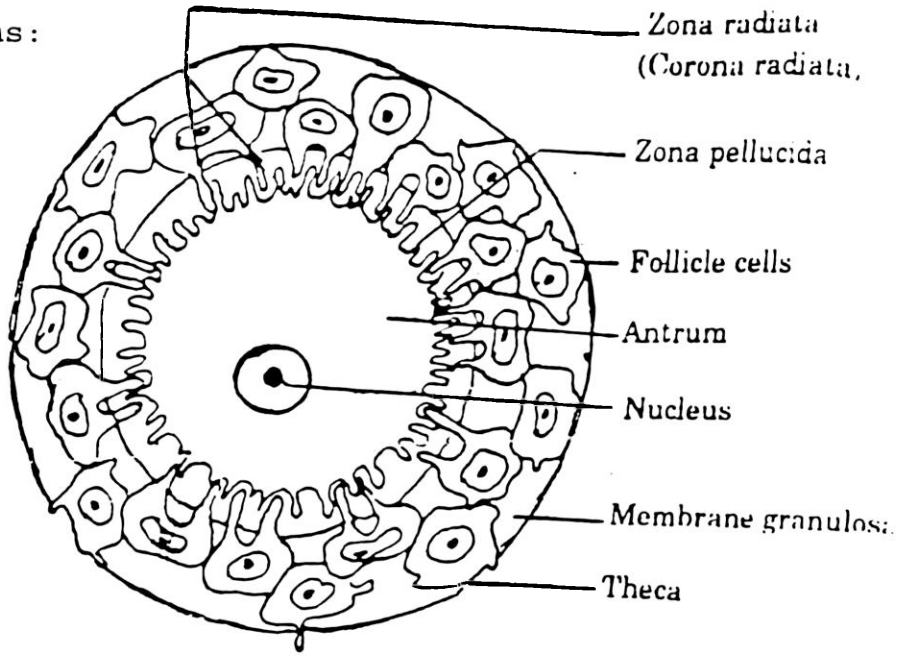
Q. No.	Obj.	Questions		Answers
MATCH THE		FOLLOWING		
1	K	A	B	
		1. Annelid egg	a. Graffian follicle	1-c
		2. Insect egg	b. Nucleus of Pander	2-d
		3. Hen's egg	c. Mosaic egg	3-e
		4. Mammalian egg	d. Centrolecithal egg	4-a
		5. Latebra	e. Albumen	5-b
		A	B	
2	U	1. Primary egg membrane	a. Hen	1-c
		2. Regulative egg	b. Hag fish	2-d
		3. Telolecithal egg	c. Vitellino membrane	3-e
		4. Chalaza	d. Echinoderms	4-a
		5. Myxine	e. Molluscs	5-b
SHORT ANSWERS				
1	U	What are the main functions of an animal egg ? Ans: 1. Supplying a haploid set of chromosomes to the embryo 2. Providing cytoplasm to the embryo 3. Supplying food reserves for the developing embryo		
2	U	Mention the criteria for the classification of animal eggs. Ans: 1. Amount of yolk 2. Distribution of yolk 3. The presence or absence of shell and 4. The type of development		
3	K	What are called cleidoic eggs ? Ans: Eggs which are laid on land with shell are called cleidoic eggs.		

Q. No.	Obj.	Questions Answers
4	K	What are called non-cleidoic eggs ? Ans: Eggs which are laid in water and are not protected by shell are called non-cleidoic eggs.
5	K	Define mosaic eggs. Mosaic eggs are those where the fate of every part of the egg becomes fixed before or at the time of fertilisation.
6	K	Define regulative eggs. Ans: Regulative eggs are those where there is no predetermination and the fate of various parts of the egg is not fixed until three cleavage divisions completed.
7	U	What is called blastodisc ? Ans: Blastodisc is a small disc-shaped area of cytoplasm at the top of the yolk mass in discoidal eggs.
8	U	How is polarity of the eggs determined ? Ans: The pole where the nucleus is found is called animal pole and the opposite pole where yolk is accumulated is called vegetal pole.
9	U	What is telolecithal egg ? Ans: Eggs where yolk is unequally distributed and concentrated at the vegetal pole than at the animal pole are called telolecithal eggs.
10	U	What are secondary egg membranes ? Ans: Hard and impermeable membranes produced by the follicle cells are called secondary egg membranes.
11	U	What are tertiary egg membranes ? Ans: Membranes secreted by the oviduct or other parts of female genital system are called tertiary egg membranes.
12	U	What is perivitelline space ? Ans: Space between vitelline membrane and cytoplasm.

Q. No.	Obj.	Questions Answers
13	K	What is the chemical composition of hen's egg ? Ans: H_2O - 48.7% Proteins - 16.6% Phospholips and fats - 32.6% Carbohydrates - 1%
14	K	What are the proteins of the avian yolk ? Ans: 1. Phosvitin and 2. Lipovitellin
15	K	What is corona radiata ? Ans: The mammalian egg is surrounded by a layer of follicle cells called corona radiata.
16	K	What are the secondary egg membranes of mammals ? Ans: 1. Theca externa 2. Theca interna 3. Corona radiata
17	K	What is Graffian follicle ? Ans: In mammals the follicle cells and the developing oocyte together constitute the Graffian follicle.
18	K	What is latebra ? Ans: In hen's egg the white yolk is represented by a central flask shaped mass below the blastodisc is called latebra.
19	K	What is chalaza ? Ans: Two spirally twisted cord like strands of albumen arise from the two ends of hen's egg.
20	K	Mention the five egg membranes of hen's egg. Ans: 1. Vitelline membrane 2. Albumen or white of egg 3. Inner shell membrane 4. Outer shell membrane 5. Shell
21	K	What is discodal egg ? Ans: The yolk occupies the largest portion of the egg except bvlastodisc region. That egg is called discoidal egg.

Q. No.	Obj.	Questions	Answers
22	K	Write a note on the shell of hen's egg ?	
		Ans: 1. It forms the outermost protective covering. 2. It is hard and porous. 3. It permits the diffusion of O_2 and CO_2.	
LONG ANSWERS			
1	U	Explain the types of eggs according to the amount of yolk.	
		Ans: 1. Alecithal egg with negligible quantity	
		2. Microlecithal eggs with small amount of yolk	
		3. Mesolecithal eggs with moderate amount of yolk	
		4. Macrolecithal eggs with enormous amount of yolk	
2	U	Explain the types of eggs according to the distribution of yolk.	
		Ans: 1. Isolecithal eggs with uniform distribution of yolk in the cytoplasm.	
		2. Telolecithal eggs unequal distribution of yolk concentrated at the vegetal pole than at the vegetal pole.	
		3. Centrolecithal eggs - concentration of yolk in the centre of the egg.	
		4. Discoidal eggs - enormous amount of yolk occupying the major portion of the egg except blastodisc at the tip of the yolk mass.	
3	S	Draw the egg of amphioxus and label the parts.	
		Ans: 	

Q. No.	Obj.	Questions	Answers
4	S	Draw the egg of frog and label the parts.	Ans: 
5	S	Draw hen's egg and label the parts.	Ans: 

Q. No.	Obj.	Questions Answers
6	S	Draw the egg of mammal and label the parts. Ans: 
7	K	Describe primary egg membranes. Ans: Membranes formed by the ovum itself are primary egg membranes, closely aderent to the surface of the oocyte. Vitellino membrane - in Amphioxus, Amphibia and birds. Zona pellucida - in mammal Jelly envelope - in sea urcher
8	U	Classify the following eggs into their types. a. Egg of amphioxus b. Frog's egg c. Hen's egg
9	K	Describe the structure of frog's egg. Ans: 1. Mesolecithal and telolecithal type 2. Vitelline hemisphere 3. Animal hemisphere 4. Vegetal hemisphere 5. Jelly layer 6. Cortical granules in the cortex

TOPIC 13 : FERTILISATION

CONTENT POINTS : External and internal fertilisation - Process of fertilisation - Significance

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	The chemical substance secreted by the egg to attract sperms is A. antifertilizin B. hyalinoxidase C. fertilizin D. sperm lysin	C
2	K	The chemical nature of fertilizin is A. glycoprotein B. lipoprotein C. chloroprotein D. protein	A
3	U	Name the substance located on the surface of the sperm which responds to attraction by the ovum. A. Fertilizin B. Antifertilizin C. Sperm lysin D. Hyaluronidase	B
4	K	The chemical nature of antifertilizin is A. protein B. glycoprotein C. lipoprotein D. acidic protein	D

Q. No.	Obj.	Questions	Answers
5	U	Which of the following is the lytic substance produced by the sperm to dissolve the egg membranes. A. Sperm lysin B. Antifertilizin C. Fertilizin D. Hyaluronic acid	A
6	K	The cementing substance holding the follicular cells together in mammals is A. Hyaluronidase B. Sperm lysin C. Hyaluronic acid D. Fertilizin	C
7	K	The acrosome of mammalian sperm secretes a lytic enzyme called A. Hyalinomidase B. Antifertilizin C. Sperm lysin D. Fertilizin	A
8	K	The mitochondria and centriole of the middle piece attain the leading position by the rotation of the sperm head and middle piece by A. 90^{o} B. 180^{o} C. 190^{o} D. 360^{o}	B

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	U	The mixing of paternal and maternal chromosomes is known as_____.	amphimixis
2	K	The fertilization that occurs outside the body of the animals is called _____.	external fertilisa-tion
3	K	The fertilisation that occurs within the body of the female is known as _____.	internal fertiliza-tion
4	K	According to_____, a chemical lock is established between the fertilizin and antifertilizin molecules during fertilisation.	F.R. Lillie
5	U	The fertilisation allows the sperm to enter into the egg except the_____.	tail
6	U	Between the fertilisation membrane and the vitelline_____ is formed.	pervitelline space
7	U	The cortical granules of cytoplasm fuse with the vitelline membrane to form _____.	fertilisa-tin membrane
8	U	The fusion of male and female pronuclei is called as_____.	amphimixis
9	U	The sperm nucleus is carried towards the ovum nucleus by_____.	asters
SHORT ANSWERS			
1	U	Define fertilisation. Ans: 1. Fusion of male and female gamates 2. Zygote	
2	U	List the functions of fertilisation. Ans: 1. Activates the egg to start development 2. Injecting a male haploid to become diploid	
3	U	Define amphimixis. Ans: Mixing of paterna and maternal chromosomes.	

Q. No.	Obj.	Questions	Answers
4	U	How is fertilization cone formed ? Ans: 1. During fertilization 2. When the sperm touches the ovum 3. Cytoplasm projects out	
5	U	How is fertilization membrane formed ? Ans: Cortical granules fuse with the vitelline membrane.	
LONG ANSWERS			
1	U	Describe the mechanism of fertilization. Ans: 1. Meeting of gametes 2. Penetration of the sperm into the egg 3. Activation of the egg 4. Amphimixis	
2	U	List the significance of fertilization. Ans: 1. Activates the egg 2. Increase O_2 consumption 3. Restores diploidy 4. New combination of genetic characters 5. A new plane of axis	

TOPIC 14 : CLEAVAGE

CONTENT POINTS : Definition - Types - Characteristics - Cleavage planes

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	Cleavage occurs in the following type of division of the zygote. A. Mitosis B. Amitosis C. Meiosis D. Cell division	A
2	K	Cleavage occurs in A. sperm B. zygote C. ovum D. blastula	B
3	U	During cleavage there is great increase in the synthesis of A. chromosome B. nucleus C. DNA D. cytoplasm	C
4	U	The type of cleavage in Amphioxis' Zygote is A. holoblastic unequal B. superficial C. discoidal D. holoblastic equal	D

Q. No.	Obj.	Questions	Answers
5	U	In which of the following holoblastic unequal cleavage occurs ? A. Insects B. Amphioxus C. Frog D. Birds	C
6	K	The type of cleavage that occurs in insects A. superficial B. total C. discoidal D. holoblastic	A
7	U	The type of cleavage that occurs in birds is A. superficial B. discoidal C. holoblastic D. holoblastic unequal	B
8	U	When are two tiers of blastomeres formed first ? A. First division B. Second divison C. Third division D. Fourth division	C

Q. No.	Obj.	Questions	Answers
9	U	In which of the following cleavage divisions of the frog the micromeres and macromeres are distinguished first. A. First division B. Second division C. Third division D. Fifth division	C
FILL IN THE BLANKS			
1	K	Cleavage is otherwise called as _____.	blastulation
2	U	At the end of cleavage the resultant daughters cells are called_____.	blastomeres
3	U	Cleavage divisions occur in_____.	zygote
4	K	The size of the cytoplasm iis proportionately much greater than the size of the_____.	nucleus
5	K	During cleavage there is great increase in the synthesis of_____.	DNA
6	K	When the cleavage furrow passes through the animal and vegetal pole through the middle axis it is called_____.	meridional plane
7	U	The cleavage plane passes from the animal pole to the vegetal pole, but not through the median axis it is called as_____.	vertical plane
8	U	The plane of cleavage bisects the egg at right angles to the median axis and halfway between animal and vegetal pole is called_____.	equatorial plane
9	U	A single layer of cells enclosing a fluid filled cavity of the blasula is _____.	blastoderm
10	U	The cavity enclosed by the blastoderm is called_____.	blastocoel

Q. No.	Obj.	Questions	Answers
11	U	The types of cleavage division has been distinguished on the basis of_____ and_____ of yolk.	amount and distribution
MATCH THE		FOLLOWING	
	U	A B	
		1. Holoblastic equal a. Frog	1-d
		2. Superficial b. Blastocoel	2-g
		3. Morula c. Nuclear division	3-a
		4. Discoidal d. Amphioxis	4-f
		5. More DNA synthesis e. Increased oxygen	5-c
		f. Birds	
		g. Insects	
SHORT ANSWERS			
1	U	Define cleavage Ans: 1. Mitotic division of zygote 2. Number of cell increases 3. Size of cell decreases 4. Blastula, blastomeres are formed	
2	U	What is holoblastic cleavage ? Ans: Entire zygote divides	
3	U	Define meroblastic cleavage. Ans: Only part of the active cytoplasm divides.	
4	U	Define blastula. Ans: 1. Hollow ball with blastocoel 2. Formed by mitosis of the zygote 3. The cells are blastomeres 4. Blastoderm is present	

Q. No.	Obj.	Questions
5	U	What is morula ? Ans: 1. Early cleavage, no blastocoel 2. Like mulberry fruit 3. Four celled stage is seen
LONG ANSWERS		
1	U	List the characteristics of cleavage. Ans: 1. Mitosis 2. Blastomeres 3. Much greater cytoplasm 4. No change in shape 5. Increased O_2 consumption 6. Increased DNA synthesis
2	U	On what basis are the cleavage types distinguished ? Explain both of them. Ans: 1. Amount and distribution of yolk 2. Total or holoblastic and partial or mereblastic 3. Holoblastic - equal - unequal 4. Meroblastic - superficial - discoidal
3	U	Describe cleavage in Amphioxus. Ans: 1. Holoblastic equal 2. First meridional - 2 cells 3. Second meridional and at right angle to the first - 4 cell 4. Third horizontal - 8 cells 5. Fourth meridional - 16 cells 6. Blastula - blastoderm blatocoel
4	U	Describe cleavage in frog. Ans: 1. Holoblastic unequal 2. First meridional - 2 cells 3. Second meridional and at right angles to the first - 4 cells 4 smaller cells (micromeres) 4. The third horizontal unequal 4 larger cells (macromeres) 5. Micromeres and macromeres 6. Morula 7. Blastula

TOPIC 15 : GASTRULATION

CONTENT POINTS : Definition - Types of morphogenetic movements - gastrulation in Amphioxus and in frog.

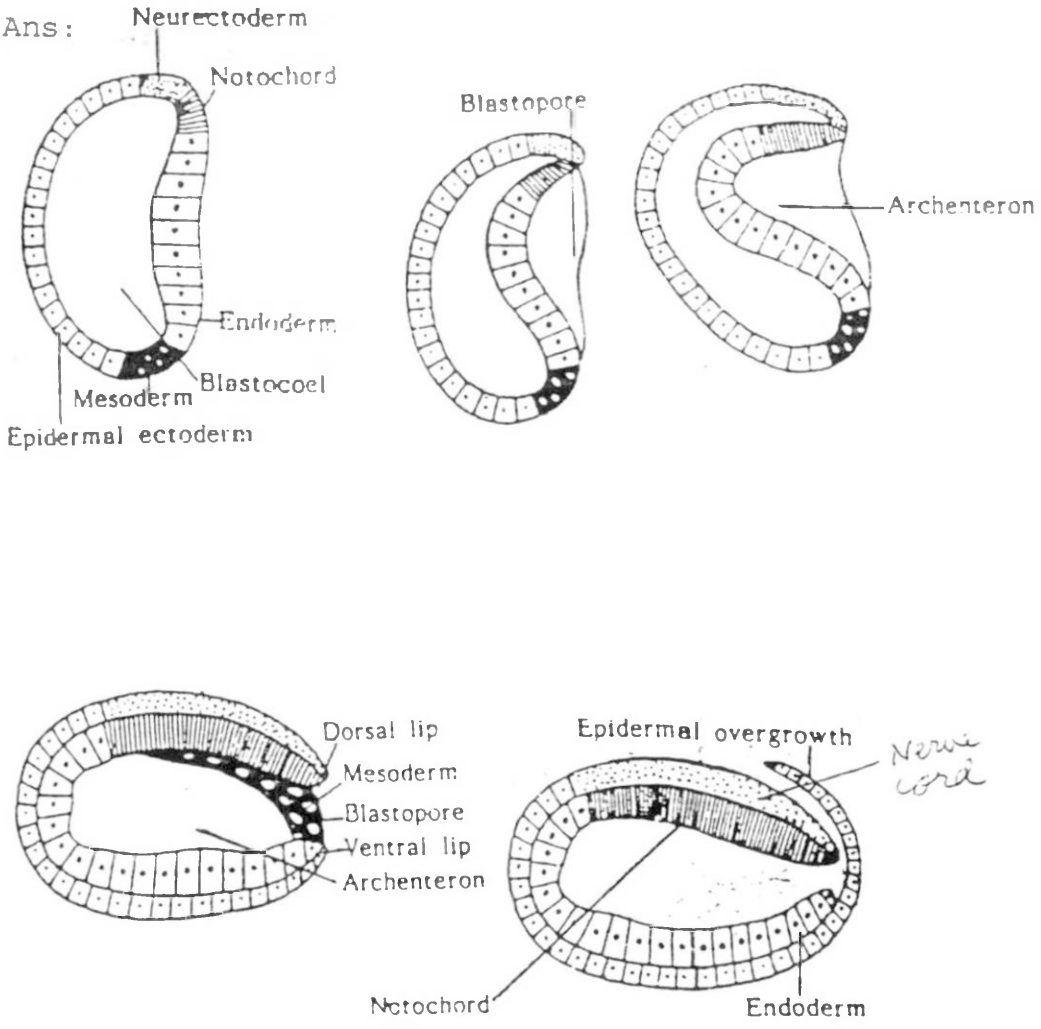
Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The morphogenetic movements occur during A. cleavage B. gastulation C. organogenesis D. growth	B
2	K	In which of the four stages of gastrulation of Amphioxus the oval blastopole becomes small circular opening. A. Emboly B. Invagination C. Epiboly D. Involution	C
3	U	How many layers are formed at the end of gastrulation in Amphioxus ? A. 3 B. 1 C. 2 D. 4	C
4	U	The first indication of gastrulation in frog is A. germ ring B. grey crescent C. emboly D. epiboly	C

Q. No.	Obj.	Questions	Answers
5	A	Yolk laden macromeres at the vegetal region of the blastopore in frog is A. crescent B. germ ring C. endoderm D. yolk plug	D
FILL IN THE BLANKS			
1	K	The phase next to the cleavage (Blastulation) is_____.	gastrulation
2	U	The nuclei become more active in governing the activities of the embryonic cells during_____.	gatrulation
3	U	During gastrulation the blastocoel disappears forming a new cavity called _____.	archenteron
4	U	The archenterm opens to the exterior by _____.	blastopore
5	U	The circular rim of the blastopore is termed as_____.	lip of the blastopore
6	U	As a result of_____ the ecotderm covers the whole embyro in frog.	epiboly
7	U	Anteroposterior axis in a horizontal plane is formed in the frog's embryo by its swinging within the_____.	vitelline membrane
MATCH THE		FOLLOWING A B	
	K	1. Epiboly a. Notochord	1-d
	K	2. Yolk plug b. Frog	2-e
	K	3. Germ ring c. Thrust in	3-b
	K	4. Emboly d. Extending upon	4-c
	K	5. Archenteron e. Yolk laden macromeres f. Micromeres g. Blastopore	5-g

Q. No.	Obj.	Questions	Answers
SHORT ANSWERS			
1	U	Define the process of gastrulation.	Ans: 1. Dynamic 2. Movement 3. Two or three layered
2	U	What is meant by morphogenetic movements ?	Ans: 1. New shape and new form 2. Movement of cells
3	U	What is epiboly ?	Ans: 1. Throwing on or extending upon 2. Ectoderm around endoderm
4	U	What is emboly ?	Ans: 1. Throwing in or thrusting in 2. Ingrowth under ectoderm
5	U	Which types of morphogenetic movements came under emboly ?	Ans: 1. Invagination 2. Involution 3. Convergence 4. Delamination
6	U	Simple type of invagination is not possible in frog. Why ?	Ans: Unequal distribution of yolk resulting in micromeres and macromeres.
7	U	Define delamination.	Ans: 1. Mass separation of one group of cells from the other. 2. Mesodermal cells from notochordal cells.
LONG ANSWERS			
1	U	List the characteristics of gastrulation.	Ans: 1. Rearrangement of cells 2. Cell division rate lowered 3. Growth insignificant 4. Oxidation intensified and metabolism changes. 5. Nuclei more active

Q. No.	Obj.	Questions	Answers
2	U	Describe gastrulation in Amphioxus.	

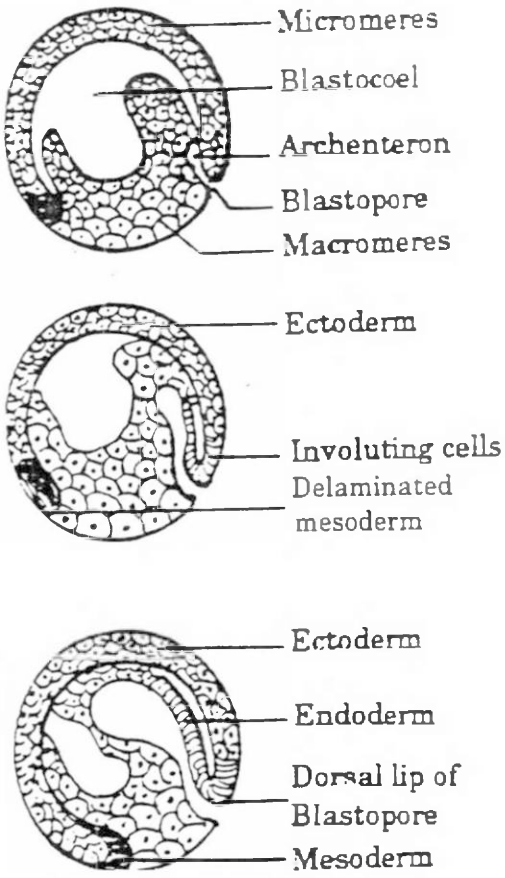
Ans:

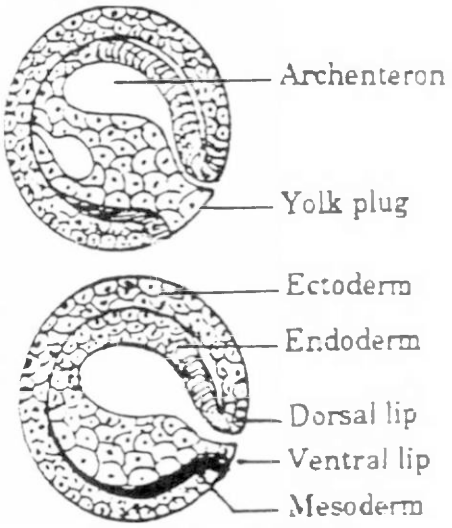


1. Invagination - flatter at the vegetal pole pushing in
2. Involution - turning under mesodermal materials into the interiol
3. Epiboly - ectodermal cells engulf the endodermal cells
4. Anteroposteroid elongation

Q. No.	Obj.	Questions	Answers
3	U	Describe gastrulation in frog.	

Ans:





1. Germ ring - grey crescent
2. Invagination and formation of blastopore
3. Convergence and involution
4. Delamination
5. Epiboly
6. Rotation

TOPIC 16 : ORGANOGENESIS

CONTENT POINTS : Tabulation - Process of tabulation - Neurogenesis, Notogenesis and Mesogenesis - Development of organs from three germinal layers.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Gastrulation is followed by A. clearage B. growth C. organogenesis D. differentiation	C
2	K	The process of formation of primary organ rudiment is called A. Neurogenesis B. Tabulation C. Mesogenesis D. Notogenesis	B
3	K	Anterior lobe of pituitary is derived from A. Ectoderm B. Mesoderm C. Endoderm D. Coelom	C
4	K	Nervous system is derived from A. ectoderm B. splanchnic mesoderm C. somatic mesoderm D. endoderm	A

Q. No.	Obj.	Questions	Answers
5	K	Which of the following is the derivative of endoderm ? A. Epiderm B. Liver C. Eye D. Heart	B
6	U	Pineal gland is derived from A. somatic mesoderm B. splanchnic mesoderm C. endoderm D. ectoderm	D
7	U	Which of the following is the derivative of mesoderm ? A. Posterior lobe of pituitary B. Heart C. Anterior lobe of pituitary D. Pancreas	B
8	K	Pancreas is the derivative of A. ectoderm B. mesoderm C. endoderm D. somatic mesoderm	C
9	A	Primardial germ cells are derived from A. ectoderm B. mesoderm C. splanchnic mesoderm D. endoderm	D

Q. No.	Obj.	Questions	Answers
10	A	Adrenal cortex is derived from A. ectoderm B. endoderm C. mesoderm D. coelom	C
FILL IN THE BLANKS			
1	A	The formation of various tissues, organs and organ systems from the germinal layers is called_____.	organogenesis
2	K	In the first phase of organogenesis the sheets of epithelium splits into smaller cellular masses and develops into_____.	Primary rudimentary organs
3	K	The development of notochord is called _____.	Notogenesis
4	K	The development of mesoderm is called _____.	Mesogenesis
5	K	Notochord and mesoderm are collectively called as_____.	Chordo-mesoderm
6	U	The space between the splanchnic mesoderm and the somatic mesoderm is called_____.	Coelom
7	U	Thyroid gland is derived from_____.	Endoderm
8	U	Glands of stomach and the intestine are derived from_____.	Endoderm
9	U	Posterior lobe of pituitary is derived from_____.	Ectoderm

Q. No.	Obj.	Questions		Answers
MATCH THE		FOLLOWING		
		A	B	
	K	1. Tubulation	a. Ectoderm	1-e
	K	2. Adrenal medulla	b. Endoderm	2-c
	K	3. Adrenal cortex	c. Ectoderm	3-b
	K	4. Anterior lobe of pituitary	d. Chordo-mesoderm	4-a
	K	5. Notochord and mesoderm	e. Neurogenesis	5-d
SHORT ANSWERS				
1	K	What is organogenesis ? Ans: The function of various tissues, organs and organ systems from the three germ layers is called organogenesis.		
2	K	What is tubulation ? Ans: Formation of rudiment organs.		
3	K	Name the germ layers. Ans: 1. Ectoderm, 2. endoderm, 3. mesoderm		
4	K	What are the three processes of tubulation ? Ans: 1. Neurogenesis, 2. Notogenesis, 3. Mesogenesis		
5	U	What is neurogenesis ? Ans: The formation of neural tube from the ectoderm and its further differentiation into brain, spinal cord and sensory organs are collectively called neurogenesis.		
6	U	What is notogenesis and mesogenesis ? Ans: The development of notochord and mesoderm is called notogenesis and mesogenesis respectively.		
7	U	What are the two layers of mesoderm ? Ans: a. Splanchnic mesoderm and b. Somatic mesoderm		

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	U	What are the oragns derived from ectoderm ? Ans: 1. Epiderms, 2. Nervous system, 3. Pigment cells, 4. Parts of the visceral and cranial cartilages, 5. Medullar portions of the adrenal gland, 6. Posterior lobe of pituitary, 7. Pineal gland, 8. Eye, 9. Internal ear, 9. Lateral line sense organ.	
2	U	What are the organs derived from mesoderm ? Ans: 1. Dermis, 2. Muscles, 3. Bones, 4. Kidney, 5. Gonads, 6. Urinary and genital duct, 7. Adrenal cortex, 8. Blood vessels, 9. Heart, 10. Lymphatic system	
3	U	What are the organs derived from endoderm ? Ans: 1. Alimentary canal, 2. Glands of stomach and intestine, 3. Tongue, 4. Liver, 5. Pancreas, 6. Thyroid, 7. Anterior lobe of pituitary, 8. Thymus, 9. Parathyroid, 10. Middle ear.	

UNIT IV : HUMAN PHYSIOLOGY

TOPIC 17 : NUTRITION

CONTENT POINTS:

1. Carbohydrates, proteins, lipids, vitamins - its types and functions
2. Need for food and classification of food.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The branch of science that deals with the understanding of the functioning of a system of the living organism. A. Anatomy B. Physiology C. Morphology D. Ecology	B
2	K	The food substance involved in body building A. Proteins B. Carbohydrates C. Lipids D. Vitamins	A
3	K	The food substance involved in producing energy A. Proteins B. Water C. Carbohydrates D. Minerals	C

Q. No.	Obj.	Questions	Answers
4	K	Energy value of 1 gm of carbohydrate A. 4.0 C B. 4.1 C C. 4.5 C D. 9.3 C	B
5	K	The energy value of 1 gm of protein A. 4.0 C B. 4.1 C C. 9.3 C D. 4.5 C	A
6	K	The energy value of 1 gm of lipid A. 4.1 C B. 9.3 C C. 4.0 C D. 4.3 C	B
7	K	The energy value of 1 big calorie (C) A. 100 C B. 1000 C C. 10000 C D. 10 C	B
8	K	Which one of the following is simple protein. A. Nucleoprotein B. Peptone C. Glycoprotein D. Albumin	D

Q. No.	Obj.	Questions	Answers
9	K	Which one of the following is a conjugate protein. A. Nucleoprotein B. Albumin C. Globulin D. Peptide	A
10	K	Which one of the following is derived protein ? A. Haemoglobin B. Globulin C. Peptide D. Albumin	C
11	K	Which one of the following give maximum energy per gram ? A. Fat B. Protein C. Carbohydrate D. Minerals	A
12	K	Which one of the following elements is not present in carbohydrate. A. Carbon B. Oxygen C. Nitrogen D. Hydrogen	C

Q. No.	Obj.	Questions	Answers
13	K	The ratio of carbon, hydrogen and oxygen in carbohydrate A. 2:3:1 B. 2:1:1 C. 1:1:2 D. 1:2:1	D
14	U	Which is the water soluble sugar formed by two monosaccharide molecules ? A. Glucose B. Starch C. Sucrose D. Fructose	C
15	K	The richest source of protein A. serials B. beans C. fruits D. vegetables	B
16	U	Which is insoluble in water but soluble in organic solvents ? A. Carbohydrates B. Proteins C. Minerals D. Lipids	D
17	U	Which help in the formationof bones and teeth ? A. Magnesium B. Potassium C. Iron D. Calcium	D

Q. No.	Obj.	Questions	Answers
18	U	The deficiency of the mineral that leads to rickets in children. A. Magnesium B. Calcium C. Iron D. Sulphur	B
19	U	The minerals associated with the formation of nucleic acid. A. Phosphorous B. Calcium C. Sodium D. Potassium	A
20	U	Which one of the following elements has no connection with the conduction of nerve impulse ? A. Magnesium B. Potassium C. Sulphur D. Sodium	C
21	U	Which one of the following elements cause retarded growth and irregular heart beat ? A. Calcium B. Phosphorous C. Potassium D. Magnesium	A

Q. No.	Obj.	Questions	Answers
22	K	Which element is essential for the regulation of osmotic pressure ? A. Sodium B. Iodine C. Chloride D. Iron	A
23	K	Which one of the following elements is essential for the formation of thyroxine ? A. Iron B. Magnesium C. Iodine D. Calcium	C
24	K	Which one of the following elements play an important role in acid-base balance ? A. Calcium B. Phosphorous C. Magnesium D. Potassium	D
25	K	The element highly concentrated in the cerebrospinal fluid. A. Chloride B. Sulphur C. Iron D. Iodine	A

Q. No.	Obj.	Questions	Answers
26	K	Vitamin A is otherwise called as A. calciferol B. tochopherol C. retinol D. riboflavin	C
27	K	Nyctalopia is caused by the deficiency of A. Vitamin D B. Vitamin C C. Vitamin B D. Vitamin A	D
28	K	Calciferol is otherwise known as A. Vitamin A B. Vitamin D C. Vitamin C D. Vitamin E	B
29	K	Which element is essential for normal fertility ? A. Vitamin K B. Vitamin E C. Vitamin D D. Vitamin	B
30	K	The vitamin essential for clotting of blood. A. Vitamin K B. Vitamin D C. Vitamin C D. Vitamin E	A

Q. No.	Obj.	Questions	Answers
31	K	Vitamin B_1 is otherwise called A. Thiamine B. Riboflavin C. Nicotic acid D. Cyanocobalamine	A
32	K	The deficiency of thiamine causes A. pellagra B. scurvey C. anaemia D. beri-beri	D
33	K	The deficiency of Vitamin B_{12} causes A. pellagra B. anaemia C. pernicious anaemia D. xerophthalmia	C
34	U	Which vitamin is destroyed when heated? A. Vitamin A B. Vitamin B C. Vitamin C D. Vitamin D	C
35	K	Vitamin C is rich in A. sunlight B. citrus fruits C. meat D. milk	B

Q. No.	Obj.	Questions	Answers
36	U	Which element is an essential constituent of protoplasm ? A. Carbohydrate B. Protein C. Water D. Lipid	C
FILL IN THE BLANKS			
1	K	The diet that contains different types of food is_____.	mixed diet
2	K	The diet that contains all the food constituents in right proportion is called_____.	balanced diet
3	K	The carbohydrates are the best energy producers and_____ are second best energy producers.	fats
4	K	_____ and minerals are the body regulators.	Vitamins
5	K	The name protein was first proposed by _____.	Mulder
6	K	_____ is an example of simple sugar.	Glucose
7	K	The insoluble polysaccharide is_____.	starch
8	K	The substance that plays a key role in the synthesis of amino acids and fatty acids is_____.	carbohydrates
9	K	Excess of glucose is stored in the form of_____.	glycogen
10	K	Excess of fat is stored in the form of _____.	adepose tissue
11	K	Excess of glucose is stored in_____.	liver
12	K	Fats are soluble in ether and_____ which are organic solvents.	chloroform

Q. No.	Obj.	Questions	Answers
13	K	Fats and their derivatives are collectively known as_____.	lipids
14	K	Iron is very important for the formation of_____ and chromatin.	haemoglobin
15	K	Deficiency of iron leads to_____.	anaemia
16	K	The term vitramin was coined by_____.	Dr. Funk
17	K	The deficiency caused by vitamin A in the cornea of the eye is called_____.	Xerophthalmia
18	K	In children the deficiency of Vitamin D causes_____.	Rickets
19	K	In adults the deficiency of Vitamin D causes_____.	Osteomalacia
20	K	The yellow light sensitive pigment containing vitamin is_____.	Vitamin B_2 (Riboflavin)
MATCH THE FOLLOWING			
		A / B	
1	K	1. Simple protein / a. Dr. Funle	1-c
		2. Polysaccharides / b. Cholesterol	2-g
		3. Term - protein / c. Globulin	3-d
		4. Derived lipids / d. Mulder	4-b
		5. Term - Vitamins / e. Glucose f. Wax g. Starch	5-a
		A / B	
2	K	1. Vitamin D / a. Beri-beri	1-c
		2. Vitamin C / b. Pellagra	2-d
		3. Vitamin B_1 / c. Calciferol	3-A
		4. Vitamin E / d. Scurvey	4-e
		5. Vitamin K / e. Tochopherol	5-f
		f. Haemorrhage	
		g. Retinol	

Q. No.	Obj.	Questions	Answers
SHORT ANSWERS			
1	U	Why is food essential for living organism ?	Ans: 1. Energy, 2. growth, 3. replacing worn out tissue
2	U	Classify food constituents on the basis of chemical composition.	Ans: 1. Proteins, 2. carbohydrates, 3. lipids, 4. minerals, 5. vitamins, 6. water.
3	U	Classify food constituents on the basis of their functions.	Ans: 1. Body builders, 2. Energy producers, 3. Body regulators.
4	U	What are the two ways by which food constituents are classified.	Ans: 1. Chemical composition and 2. Functions
5	K	Comment upon the constituent of body builders.	Ans: 1. Composition of the body and 2. eg. Protein.
6	K	Comment upon the body regulators.	Ans: 1. Regulating and coordinating various functions and 2. eg. Minerals
7	U	Distinguish between body builders and body regulators.	Ans: 1. Composition of the body, 2. Co-ordination of various functions of the body.
8	U	What are called simple proteins mention with an example ?	Ans: 1. On hydrolysis yield amino acids. 2. Albumin/globulin
9	U	What are conjugate proteins. Mention with an example.	Ans: 1. Combination of protein with non-protein. 2. Nucleoprotein/glycoprotein/haemoglobin

Q. No.	Obj.	Questions Answers
10	U	What are derived proteins with an example ? Ans: 1. Partial hydrolysis of natural proteins. 2. Peptones/peptides
11	U	What are the significance of proteins ? Ans: 1. Catalysing enzymes 2. Structural component 3. Body building
12	U	Mention the types of carbohydrates with example. Ans: 1. Monosaccharide glucose 2. Disaccharide sucrose 3. Polysaccharide starch
13	U	Briefly write the significance of carbohydrates. Ans: 1. Chief energy producers 2. Synthesis of amino acids and fatty acids
14	U	Distingiush between carbohydrates and lipids. Ans: 1. Less energy and more energy 2. Ratio between hydrogen and oxygen differences
15	U	What are the significance of lipids ? Ans: 1. Rich source of reserve energy 2. Insulators 3. Stored as adipose tissue
16	U	What are minerals ? Ans: 1. Regulating metabolic activities 2. Normal functioning
17	U	What are vitamins ? Ans: 1. Normal growth 2. Prevention of deficiency diseases
18	U	What is the role of ergosterol ? Ans: Converting UV rays into Vitamin D

Q. No.	Obj.	Questions Answers
19	U	What are the functions of thiamine ? Ans: 1. Normal growth 2. Appetite 3. Proper functioning of nervous system
20	U	What are the deficiency symptoms of Riboflavin ? Ans: 1. Reddening of eye 2. Roughness of the cornea 3. Soreness of the tongue 4. Soreness of the corners of lips
21	U	What are the deficiency symptoms caused by nicotinic acid ? Ans: 1. Soreness and inflammation of the tongue and mouth 2. Pigmentation and thickening of the skin 3. Degeneration of nervous system
22	U	What are the symptoms of scurvey ? Ans: 1. Bleeding gums 2. Losening and falling of teeth 3. Intramuscular haemorrhage
LONG ANSWERS		
1	U	Give an account of proteins and their significance. Ans: 1. Mulder 1839 2. Components of protoplasm 3. Composition 4. Simpler units called amino acids 5. Functions 6. Types 7. Significance 8. Sources
2	U	Classify carbohydrates and add a note on their significance. Ans: 1. Monosaccharide 2. Disaccharide 3. Polysaccharide 4. Significance

Q. No.	Obj.	Questions Answers
3	U	Give an account of lipids and their uses. Ans: 1. Composition 2. Sources (energy producer) 3. Storage 4. Types 5. Functions
4	U	How do mineral salts help the body ? Give a brief account of any four minerals. Ans: 1. Regulate 2. Ca, Mg, Na, P, Fe, I, K, Mg, Cl, S
5	U	Give an account of the chemical name, sources and deficiency diseases of fat soluble vitamins. Ans: 1. Retinol (A) 2. Calciferol (D) 3. Tocopherol (E) 4. Phylloquinone (K)
6	U	Give an account of chemical name, sources, and deficiency diseases of water soluble vitamins. Ans: 1. B_1, 2. B_2, 3. Niacin, 4. B_6, 5. B_{12}, 6. Vit. C
7	A	If a person is suffering from Xerophthalmia and Pellagra diseases. Mention which vitamins cause the above note on their role in metabolism. Ans: 1. Xerophthalmia Vit. A 2. Pellagra - Niacin
8	U	What are the main human food constituents ? Mention one example of plant and animal sources for each. Ans: 1. Protein 2. Carbohydrates 3. Lipid 4. Miinerals 5. Vitamins 6. Water

TOPIC 18 : DIGESTIVE SYSTEM

CONTENT POINTS:

1. Digestive system includes various organs concerned with ingestion, digestion, absorption and elimination of undigested waste.
2. Digestion in mouth, stomach, small intestine, pancreatic enzymes, bile, secretions in the small intestine, absorption, caecum and appendix, large intestine -assimilation egestion.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	The outermost layer that makes up the wall of alimentary canal is A. muscular layer B. submucosa C. mucosa D. serosa	D
2	K	The antibacterial agent present in saliva is A. ptyalis B. lysozyme C. lysosoma D. bile	B
3		The volume of gastric juice secreted per day ranges between A. 1000 ml to 1200 ml B. 800 ml to 1500 ml C. 1500 ml to 2500 ml D. 2500 ml to 2800 ml	C

Q. No.	Obj.	Questions	Answers
4	U	What makes the food acidic in the stomach ? A. H_2SO_4 B. HCl C. HNO_3 D. Bicarbonate	B
5	U	Which one is not the subdivision of the small intestine ? A. Stomach B. Duodenum C. Jejunum D. Ileum	A
6	K	The pH of pancreatic juice is A. 6-7 B. 7-8 C. 8-9 D. 9-10	C
7	U	Which one of the following enzymes act on polypeptides ? A. Ptyaline B. Amylase C. Carboxypaptidase D. Pepsin	C

Q. No.	Obj.	Questions	Answers
8	U	Out of the following enzymes which one hydrolysis starch into maltose. A. Pepsin B. Lipase C. Trypsin D. Amylase	D
9	U	Out of the following enzymes which one breaks down fats into fatty acids and glycerol. A. Trypsin B. Renin C. Lipase D. Pepsin	C
10	K	Glucose and amino acids are absorbed by A. diffusion B. osmosis C. active transport D. selective absorption	C
11	K	Fatty acids and glycerol are absorbed by A. lacteals B. blood capillaries C. large intestine D. oesophagus	A

Q. No.	Obj.	Questions	Answers
12	K	Vitamins are absorbed by the process A. osmosis B. selective absorption C. diffusion D. active transport	C
13	K	Minerals are absorbed by the process A. selective absorption B. osmosis C. diffusion D. active transport	A
14	K	Water is absorbed through A. selective absorption B. osmosis C. active transport D. diffusion	B
15	K	The process of removal of faecal material is known as A. deglutition B. ingestion C. digestion D. egestion	D
16		The length of the large intestine in man is A. 1.5 mt B. about 1.5 mt C. 8 mt D. 6.5 mt	B

Q. No.	Obj.	Questions	Answers
17	K	Parotid, submaxillary and sublingual are glands connected with the A. mouth B. stomach C. duodenum D. small intestine	A
FILL IN THE BLANKS			
1	K	_____ are called as Biocatalysts.	Enzymes
2	K	The process of food intake is called _____.	Ingestion
3	K	The pH of saliva is between_____.	6 and 7.4
4	K	The swallowing of food from the mouth into the stomach is known as_____.	Deglutition
5	K	The opening from the stomach into the duodenum is known as_____.	Pylorus
6	K	The milky white semifluid paste like substance in the stomach is called _____.	Chyme
7	K	HCl is secreted by_____.	Oxyentic cells
8	K	The bolus is pushed through the oesophagus into the stomach by_____.	Peristaltic movement
9	K	Renin converts milk into curd like in the presence of_____ salts.	calcium
10	K	_____ duct leading from the liver and pancreas opens into the duodenum.	Hepato-pancreatic duct
11	K	_____ converts proteins into peptones in the stomach.	Pepsin
12	K	_____ converts milk into curd like in the stomach.	Renin

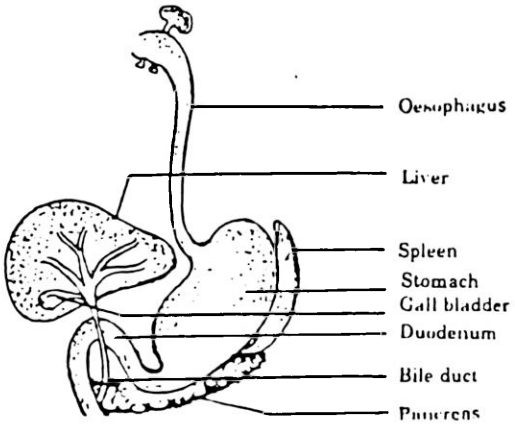
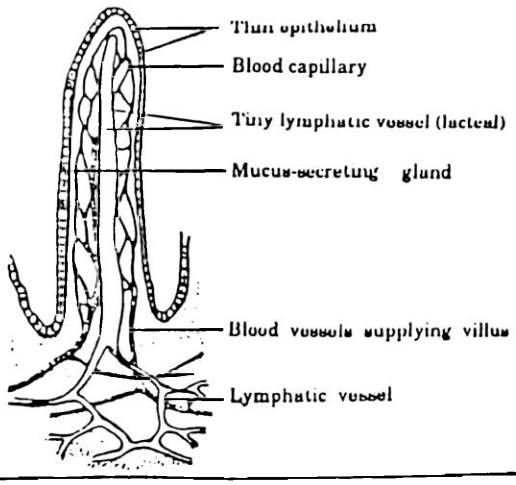
Q. No.	Obj.	Questions	Answers
13	K	_____ and_____ are the breakdown products of haemoglobin.	Bilirubin & Biliverdin
14	K	_____ emulsifies the fats.	Bile
15	K	Persons on a high fat diet are prone to the development of_____.	obesity
16	K	_____ is a proteolytic enzyme acting on polypeptides.	Trypsin
17	K	Bile juice contains_____ which neutralises HCl.	sodium dibarconate
18	K	The ultimate absorbing units are _____.	villi
19	K	Pancreatic juice is the secretion of the_____ part of the pancreas.	exocrine
20	K	Glucose and amino acids are absorbed by the process of_____.	active transport
21	K	In the ileum water is absorbed by the process of_____.	osmosis
22	K	In the ileum, minerals are absorbed by the process of_____.	selective absorption
23		In the ileum vitamins are absorbed by the process of_____.	diffusion
24	K	The site of absorption of digested food in the alimentary canal is_____.	small intestine
25	K	The indigestible material is commonly termed as_____.	roughage
26	K	The process of removal of faecal material is known as_____.	egestion or defaecation
27	K	The aperture of small intestine into large intestine is guarded by an _____.	ilio caecal valve
28	K	Absorption of_____ from faecal matter occurs in the large intestine.	water

Q. No.	Obj.	Questions		Answers
29	K	The process of synthesis of complex food materials from simpler ones is known as_____.		assimilation
MATCH THE FOLLOWING				
		A	B	
1	K	1. Active transport	a. Mucus	1-d
		2. Diffusion	b. Mineral	2-c
		3. Osmosis	c. Vitamin	3-e
		4. Lubrication	d. Glucose	4-a
		5. Selective absorption	e. Water	5-b
		A	B	
2	K	1. Intake of food	a. Chyme	1-d
		2. Swallowing	b. Defaecation	2-c
		3. Indigestible material	c. Deglutition	3-e
		4. Removal of faeces	d. Ingestion	4-b
		5. Semi-fluid paste	e. Roughage	5-a
		A	B	
3	K	1. Antibacterial agent	a. Trypsin	1-c
		2. Proteolytic enzyme	b. Bilirubin	2-a
		3. Bile pigment	c. Lysozyme	3-b
		4. Fat	d. Oxyntic cells	4-e
		5. Hydrochloric acid	e. Lipase	5-d

Q. No.	Obj.	Questions	Answers
SHORT ANSWERS			
1	K	What is digestion ?	Ans: Conversion of complex and insoluble constituents of food into simpler and soluble substances.
2	K	What are the layers that make up the wall of alimentary canal ?	Ans: 1. Serosa, 2. Muscular layer, 3. Submucosa, 4. Mucosa.
3	K	Name the salivary glands present in the mouth.	Ans: 1. Parotid, 2. sub-maxillary, 3. sublingual.
4	K	What is the function of ptyalin ?	Ans: Conversion of starch into maltose.
5	K	What is the function of mucus of saliva ?	Ans: Provides lubrication for swallowing.
6	K	What is mastication ?	Ans: Conversion of food into a bolus in the mouth.
7	K	What are the processes included in the term 'nutrition' ?	Ans: Ingestion, digestion, absorption, assimilation and egestion.
8	K	What is chyme ?	Ans: Milky white semifluid paste like substance called chyme.
9	U	What are the functions of HCl ?	Ans: 1. Makes the food into acid, 2. kills bacteria, 3. activates papsine
10	U	Why the medium is converted into acidic in the stomach ?	Ans: Makes the food suitable for the action of the enzymes.

Q. No.	Obj.	Questions Answers
11	K	What is the action of pepsin ? Ans: Converting proteins into peptones.
12	K	What is the action of renin ? Ans: Converting soluble carcinogen into insoluble casein.
13	K	What are the enzymes present in gastric juice ? Ans: 1. Pepsin, 2. Renin
14	K	What are bile pigments ? Ans: 1. Bilirubin, 2. biliverdin
15	K	What are bile salts ? Ans: 1. Sod. Glycocholate, 2. sodium furoglycocholate.
16	K	What are the breakdown products of haemoglobin ? Ans: 1. Bilirubin and 2. Biliverdin.
17	U	Why is the medium converted into alkaline in the duodenum ? Ans: For the efficient functioning of pancreatic enzymes.
18	U	What are the uses of bile salts ? Ans: Lowering the surface tension of water thereby emulsifying the fats.
19	K	What is the action of trypsin ? Ans: Converts peptones into peptides.
20	K	What is the function of amylase ? Ans: Hydrolyses starch into maltose.
21	K	What is the action of pancreatic lipase ? Ans: Breaksdown fats into fatty acids and glycerol.

Q. No.	Obj.	Questions	Answers
22	K	Mention any four proteolytic enzymes.	Ans: 1. Pepsin, 2. trypsin, 3. chymo-trypsin, 4. carboxypeptides.
23	K	Define absorption	Ans: The process by which the end products of digestion pass through the intestinal epithelium and enter the blood stream.
24	K	Define enzymes.	Ans: Proteinaceous substance accelerating metabolic reactions called as biocatalysts.
25	K	What is appendicitis ?	Ans: Inflammation of appendix called appendicitis.
26	K	What is called caecum ?	Ans: The dilated pouch present at the junction of large intestine and ileum.
27	K	What is appendix ?	Ans: The blind sac arising from the caecum called appendix.
28	K	What are the divisions of large intestine ?	Ans: Colon, rectum and anus.

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	S	Draw a neat and labelled diagram of stomach with associated glands.	Ans: **Stomach with associated glands** 
2	U	Explain what happens to food in the mouth.	Ans: 1. Secretion of saliva from the salivary glands 2. Substances present in saliva 3. Action of ptyalin 4. Function of lysozyme 5. Alkaline medium by $NaHCO_3$
3	S	Draw a neat and labelled diagram of a villus.	Ans: **Structure of a Villus** 

Q. No.	Obj.	Questions Answers.
4	U	Explain the absorption of digested food in the small intestine. Ans: 1. Amino acids and glucose by active transport 2. Water by osmosis 3. Minerals by selective absorption 4. Vitamins by diffusion 5. Fatty acids and glycerols by lacteals of the villi.
5	U	Explain assimilation. Ans: 1. Definition 2. Amino acids, glucose, fatty acids and glycerols - absorbed by the blood resynthesized to form prteins, carbohydrates and fats inside the cells. 3. Replacement of protoplasm.
6	U	Explain defaecation or egestion. Ans: 1. Definition 2. Roughage 3. Colon and rectum filled with faeces 4. Desire to expel 5. Sphincter muscles opening
7	U	Write notes on large intestine. Ans: 1. Length and division of large intestine 2. Divisions of colon 3. Iliocaecal valve 4. Absorption of water

TOPIC 19 : RESPIRATION

CONTENT POINTS: Organs of Respiration and Mechanism

1. Respiration is the catabolic process in which the oxidation of the food substances takes place in the body to release energy.

Phases of respiration - External Respiration (Breathing)
Internal Respiration (Oxidation)

Types of respiration - Cutaneous respiration, pulmonary respiration, bucco-pharyngeal respiration

Mechanism - Inspiration and Expiration

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	The larynx lies below A. pharynx B. trachea C. glottis D. epigottis	A
2	K	The larynx opens into A. pharynx B. trachea C. epiglottis D. lungs	B
3	K	The glottis is guarded by a cartilage flab called A. larynx B. trachea C. pharynx D. epiglottis	D

Q. No.	Obj.	Questions	Answers
4	K/U	Which keeps the food out of the respiratory track during swallowing A. glottis B. epiglottis C. trachea D. cilia	B
5	K	The length of the trachea in man is A. 15 cm B. 20 cm C. 10 cm D. 12 cm	C
6	K	The trachea is lined internally by A. columnar epithelium B. ciliated epithelium C. squamous epithelium D. ciliated columnar epithelium	D
7	K	The principal respiratory organ in man is A. lungs B. nasal passage C. larynx D. trachea	A
8	K	Which is the respiratory surface in man ? A. Trachea B. Lungs C. Alveoli D. Air sacs	C

Q. No.	Obj.	Questions	Answers
9	K	The diameter of the alveolus is A. 0.2 mm B. 0.02 mm C. 0.002 mm D. 0.2 cm	A
10	K	How many alveoli are present in the human being A. above 300 million B. about 300 million C. below 300 million D. 300 million	B
11	K	The molecular weight of haemoglobin is A. 6,800 daltons B. 68,000 daltons C. 680 daltons D. 6,80,000 daltons	B
12	K	The percentage of haeme in haemoglobin is A. 5% B. 50% C. 95% D. 10%	A
13	K	The percentage of globin in haemoglobin is A. 100% B. 50% C. 95% D. 5%	C

Q. No.	Obj.	Questions	Answers
14	K	The amount of haemoglobin present in 100 ml of blood is A. 10 gms B. 20 gms C. 5 gms D. 15 gms	D
15	K	The number of iron atoms present in a haemoglobin molecule is A. 1 B. 2 C. 3 D. 4	D
16	K	Each molecule of haemoglobin carries O_2 molecules A. 4 B. 3 C. 2 D. 1	A
17	K	Which associate with oxygen to be carried from lungs to tissues A. RBC B. WBC C. Hb D. Blood	C

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	K	The organs of respiration consists of respiratory passages and_____.	lungs
2	K	The pharynx is commonly called as_____.	throat
3	U	The larynx is otherwise called as_____.	voice box
4	U	The trachea is held permanently open by _____ in its wall.	cartilage-nous rings
5	U	_____ divides the body cavity into the thorax and abdomen.	diaphragm
6	K	The lungs are enveloped by the double layered membrane called_____.	pleura
7	K	The lower surface of the lungs is concave to accommodate_____.	diaphragm
8	K	The trachea begins at the lower border of the_____.	larynx
9	K	Each bronchus divides into many fine tubes called_____.	bronchioles
10	K	All the capillaries of the alveoli originate from the_____.	pulmonary artery
11	K	The floor of the thoracic cavity is completely closed by_____.	diaphragm
12	U	Inspiration is an_____ process.	active
13	U	Expiration is a _____ process.	passive
14	A	Red colour of the blood is due to_____.	haemo-globin
15	A	When the partial pressure of O_2 is high in the_____ oxygen binds with the haemoglobin.	pulmonary capillaries
16	U	Haemoglobin combines with CO_2 to form _____.	carbamino compounds

Q. No.	Obj.	Questions	Answers
MATCH THE FOLLOWING			
1	U	A 1. Respiratory pigment 2. Trachea 3. Respiratory surface 4. Inspiration 5. Pleura B a. Intercostal muscles b. Air sacs c. Haemoglobin d. Ciliated columnar epithelium e. Blood f. Lungs g. Alveoli	1-c 2-d 3-g 4-a 5-f
SHORT ANSWERS			
1	K	What are the functions of nasal cavity ? Ans: 1. Warming or cooling the air 2. Moisten the air 3. Removes dust	
2	U	What are the uses of cartilage rings in trachea ? Ans: 1. Elastic - keeping open 2. Prevent collapsing	
3	K	What is epiglottis ? Ans: 1. Cartilage flap 2. Covers glottis during swallowing	
4	K	What is mediastinum ? Ans: 1. Space between two lungs 2. Heart and oesophagus	
5	K	What are alveolar ducts ? Ans: 1. Short tubes 2. Formed by the bronchioles	

Q. No.	Obj.	Questions Answers
6	U	How are the lungs protected by bones ? Ans: a. sternum b. vertebral column c. ribs
7	K	Name the muscles connected with the mechanism of respiration. Ans: 1. Intercostal muscles 2. Diaphragm
8	U	What is the role of Hb in respiration ? Ans: 1. Transport O_2 from lungs 2. Carry CO_2 from tissues to lungs.
LONG ANSWERS		
1	U	Describe the nasal passage. Ans: 1. Nasal cavity 2. Pharynx 3. Larynx 4. Trachea leading to lungs
2	S	With a neat diagram describe the structure of lungs. Ans: 1. Location 2. Covering 3. Mediastinum 4. Bronchioles 5. Air sacs, alveoli

Q. No.	Obj.	Questions Answers
3	U	Explain the mechanism of inspiration in man ? Ans: 1. Contraction of external intercostal muscles 2. Flattening of diaphragm 3. Increase of thoracic volume 4. Diagram
4	K	Give an account of haemoglobin. Ans: 1. Respiratory pigment 2. Molecular weight 3. Haem and globin 4. Amount in 100 ml of blood 5. Gas exchange

TOPIC 20 : CIRCULATION

CONTENT POINTS: Structure of heart, working of heart, origin of heart beat, composition of blood, functions of blood and clotting.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	william Harvey discovered the function of heart and the circulation of blood in the year A) 1628 B) 1728 C) 1828 D) 1928	A
2	U	The heart can initiate its own impulse rhythmically and this feature is called as A) excitability B) stimulation C) rhythmicity D) conductivity	C
3	K	The deoxygenated blood from the heart muscles to the right atrium is through A) inferior venacava B) superid venacava C) coronary vein D) pulmonary artery	C

Q. No.	Obj.	Questions	Answers
4	K	Which of the four walls of the heart is the thickest ? A) right ventricle B) left ventricle C) right atrium D) left atrium	B
5	U	The wall of the left ventricle is more thick because A) gets more blood B) gets the oxygenated C) pumps more blood D) forces of contraction	D
6	K	The other name of mitral valve is A) tricuspid B) bicuspid C) semilunar D) spiral valve	B
7	K	The mesurement of S.A. node is A) 2 cm x 2 mm B) 2 cm x 2 cm C) 2 mm x 2 m D) 2 mm x 2 cm	A

Q. No.	Obj.	Questions	Answers
8	A	The percentage of plasma in the blood is A) 55% B) 60% C) 65% D) 68%	A
9	K	The percentage of blood carpuscles is A) 50% B) 45% C) 40% D) 38%	B
10	K	The percentage of water in the plasma is A) 91-92% B) 90-91% C) 91-93% D) 92-95%	A
11	K	The life span of RBC is A) 100-120 days B) 100-130 days C) 100-140 days D) 100-150 days	A

Q. No.	Obj.	Questions	Answers
12	U	Number of RBCs in a cubic mm of blood approximately is A) 2-5 millions B) 3-5 millions C) 5-5.5 millions D) 6 millions	C
13	K	The life span of WBC is A) 1 week B) 1-2 weeks C) 1-3 weeks D) 2-3 weeks	D
14	K	1 cubic mm of blood contains WBC A) 6000-8000 B) 6000-7000 C) 8000-10000 D) 17000-18000	C
15	U	Which blood cells protect the body against the invasion of foreign body ? A) RBC B) WBC C) Platelets D) None of the above	B
16	A	The number of platelets present in a cubic mm of blood is (approx) A) 20,000 B) 25,000 C) 25,00,000 D) 40,000	C

Q. No.	Obj.	Questions	Answers
17	K	The pH of blood is A) 7 B) 7.3 C) 7.35-7.45 D) 7.8	C
18	K	Which of the following is left out after clot ? A) RBC B) Plasma C) Platelets D) Serum	D
19	U	Which of the following does not take part in clotting A) WBC B) Platelets C) Plasma D) Vit. K	A
20	K	Platelets disintegrate and liberate A) prothrombin B) thrombin C) thromboplastin D) fibrin	C
21	K	Thromboplastin converts prothrombin into thrombin with the help of A) vitamin K B) Ca ions C) Na ions D) K ions	B

Q. No.	Obj.	Questions	Answers
22	K	For the formation of prothrombin the substance essential is A) vitamin K B) vitamin E C) Ca ions D) Na ions	A
23	K	The time taken for clotting of blood is A) 1-2 minutes B) 3-8 minutes C) 9-10 minutes D) 10-11 minutes	B
24	K	The normal systolic blood pressure in an adult man is A) 70 mm Hg B) 80 mm Hg C) 110 mm Hg D) 120 mm Hg	D
25	K	The normal diastolic pressure in an adult man is A) 80 mm Hg B) 70 mm Hg C) 60 mm Hg D) 50 mm Hg	A
FILL IN THE BLANKS			
1	K	The function of heart and the circulation of blood was first discovered by _____.	William Harvey

Q. No.	Obj.	Questions	Answers
2	K	The heart is situated in the middle _____ in between the two lungs.	Mediastrinum
3	K	The heart is covered by a double layered membrane called_____.	Pericardium
4	K	The wall that separates the atria is called_____.	Interatrial septum
5	K	The inner projections of the ventricular wall are called_____.	Papillary muscles
6	K	The pupillary muscle are attached to the valves by_____.	Chordae tendinae
7	U	The systemiic circulation starts in the left ventricle and ends in the_____.	right atrium
8	U	The pulmonary circulation starts in the _____ and ends in the left atrium.	right ventricle
9	K	The heart beat originates from_____.	S.A. node
10	U	The only liquid tissue in our body in addition to lymph is_____.	blood
11	K	Plasma is_____ coloured.	straw
12	U	A decrease in the number of RBC is called_____.	anaemia
13	U	An increase in the number of RBC in the blood is called_____.	polycythemia
14	U	A decrease in the number of WBC in the blood is called_____.	Leukopenia
15	U	An increase in the number of WBC in the blood is called_____.	Leukemia
16	K	RBC is produced in_____.	the bone marrow
17	K	WBC is produced in_____.	lymph glands

Q. No.	Obj.	Questions	Answers
18	K	Platelets are produced by the disintegration of_____.	megakaryo-cytes
19	U	The straw coloured fluid formed at the time of blood clotting is_____.	serum
20	U	Vitamin K is required by_____ for the normal formation of prothrombin.	liver
21	K	Heparin was first isolated from_____.	liver
22	K	Heparin is also secreted by_____.	mast cells
23	U	Formation of blood clot within the blood vessel is called_____.	thrombosis
24	K	Thrombin circulates in the blood vessels is called_____.	embolus
25	K	The blood pressure is measured by an instrument called_____.	Sphigmo manometer

MATCH THE FOLLOWING

1	U	1. Pacemaker	a. Antibody	1-d
		2. Neutrophils	b. Bicuspid	2-c
		3. Excess RBC	c. Engulf	3-g
		4. Monocyte	d. S.A. node	4-e
		5. Mitral valve	e. Phagocytes	5-b
			f. Tricuspid	
			g. Polycythemia	

SHORT ANSWERS

1 U What are the functions of pericardium ?

Ans: 1. Protect the heart shock absorber
2. Free movement.

2 U How is cardiac muscle suited for its function ?

Ans: 1. Rhythmicity, 2. excitability,
3. conductivity 4. contractility

3 U Mention the blood vessels that enter into the heart.

Ans: 1. Venacava, 2. pulmonary arteries

Q. No.	Obj.	Questions	Answers
4	K	List the valves that maintain the one way flow of the blood. Ans: 1. bicuspid, 2. tricuspid, 3. semilunar	
5	K	Name the two semilunar valves and mention where they are located. Ans: 1. Pulmonary and 2. aortic	
6	K	Define diastole and systole. Ans: 1. Relaxation and 2. contraction	
7	U	What are the two divisions of circulatory system ? Ans: 1. systemic and 2. pulmonary	
8	U	Name the nerves that supply the heart. Ans: 1. Vagus and 2. sympathetic	
9	U	Human heart is myogenic. Why ? Ans: 1. Inherent power of muscles and 2. rhythmicity	
10	A	Distinguish the two heart sounds. Ans: 1. long and dull sound closure of av valve, 2. short and sharp sound closure of the semilunar valve.	
11	U	Define heart beat. Ans: 1. a systole, 2. v. systole and 3. pause	
12	U	Write short note on bundle of His. Ans: 1. ventricle and 2. two branches	
13	U	What is heart block ? Ans: Defective production of SA node.	

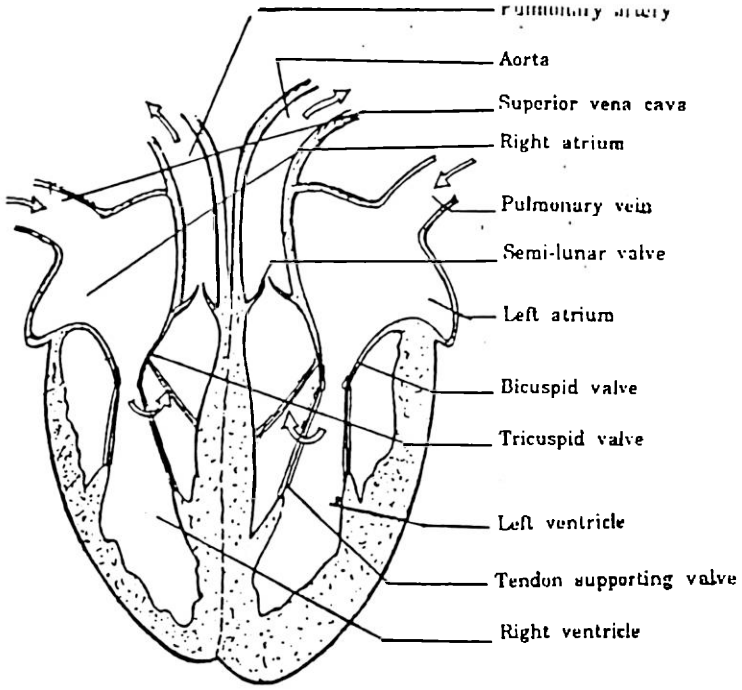
Q. No.	Obj.	Questions	Answers
14	U	Distinguish between arteries and veins. Ans: 1. walls muscular elastic, thick, 2. no valves as their cause as pressure is more. 1. Walls thin, 2. valves on their course pressure is less.	
15	U	Write note on capillaries. Ans: 1. thin walled, 2. formed due to branching of arteries and 3. unit to form veins.	
16	U	Point out the plasma proteins and give their functions. Ans: 1. albumin, globulin, fibrinogen and 2. osmotic pressure immunity clotting.	
17	U	Mention NPN present in the plasma. Ans: 1. urea, 2. uric acid, 3. creatinine, 4. ammonia, 5. amino acids.	
18	U	Point out the types of granulocytes. Give their functions. Ans: 1. Eosinophils - detoxification, 2. Basophils - amoeboid, 3. neutrophils - engulf.	
19	U	Point out the types of agranulocytes. Give their functions. Ans: 1. lymphocytes - antibodies, 2. monocytes - phagocyte.	
20	U	What is heparin ? Ans: 1. anti coagulant, 2. mast cells and 3. liver.	
21	U	What is heart attack ? Ans: 1. clot in the coronary artery.	

Q. No.	Obj.	Questions	Answers
22	U	What is stroke ? Ans: 1. Cerebral thrombosis and 2. death within 24 hours.	
23	U	What is cardiac cycle ? Ans: 1. Contraction and 2. relaxation of heart and pause	

LONG ANSWERS

1 U Draw a neat diagram showing the L.S. of human heart and label the parts.

Ans:



2 U Describe the internal structure of the heart.

Ans: 1. four chambers, 2. septa, 3. valves, 4. blood vessels entering, 5. blood vessels leaving.

3 U Describe the working of heart.

Ans: 1. Receiving the oxygenated and deoxygenated blood by the atria (diastole), 2. systole, 3. ventricular diastole, 4. pushing the blood by the ventricles (V. contraction), 5. valves.

Q. No.	Obj.	Questions Answers
4	U	Explain the origin and conduction of heart beat. Ans: 1. heart beat, 2. S.A. node, 3. A.V. node, 4. bundle of His, 5. purkinje system.
5	U	Give an account of RBC Ans: 1. Origin, 2. Life span, 3. Number, 4. Function, 5. Increase, 6. Decrease, 7. Destruction.
6	U	Give an account of WBC ? Ans: 1. Origin, 2. Life span, 3. Types, 4. Number, 5. Function, 6. Increase, 7. Decrease, 8. Destruction.
7	U	List any five functions of blood. Ans: 1. Transport of food, 2. Transport of waste, 3. Transport of gas, 4. Transport of hormones, 5. Temperature regulation, 6. Maintain osmotic pressure, 7. pH maintain, 8. Water balance, 9. Defence, 10. Coagulation.
8	U	Describe the mechanism of blood coagulation. Ans: 1. Platelets - thromboplastin, 2. Prothrombin - Vitamin K, 3. Thrombin - Ca ions, 4. Fibrinogen - fibrin, 5. Time.

TOPIC 21 : EXCRETION

CONTENT POINTS:

1. Kidneys are major excretory organs of vertebrates.
2. The outer part of kidney is cortex made up of malpighian corpuscles and inner medulla with collecting tubules.
3. The structural functional unit of kidneys is a nephron.
4. Urine formation is by processes of ultra filtration selective reabsorption and tubular secretion.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	Which one of the following excretes most of the nitrogenous wastes ? A) Skin B) Lung C) Kidney D) Colon	C
2	K	The measurement of the kidney is A) 11 cm in length, 6 cm in breadth and 3 cm in thickness B) 6 cm in length, 3 cm in breadth and 11 cm in thickness C) 3 cm in length, 11 cm in breadth and 6 cm in thickness D) 11 cm in length, 3 cm in breadth and 6 cm in thickness	A
3	K	The cortical tissue extending in between the pyramids forms A) renal pyramids B) calyas C) renal columns of Bertini D) renal pelvis	C

Q. No.	Obj.	Questions	Answers
4	K	The diameter of malphigian capsule is A) 0.1 mm B) about 0.2 mm C) about 0.3 mm D) 0.4 mm	B
5	K	In the uriniferous tubule the brush border is seen in A) malphighian capsule B) proximal convoluted tubule C) Henla's loop D) distal convoluted tubule	B
6	K	Which one of the following acts as a biological filter ? A) Proximal convoluted tubule B) Henla's loop C) Distal convoluted tubule D) Malphighian body	D
7	K	The hydrostatic pressure of blood at the afferent glomerular arteriole is about A) 50 mm Hg B) 60 mm Hg C) 75 mm Hg D) 80 mm Hg	C

Q. No.	Obj.	Questions	Answers
8	K	In 24 hours the total volume of glomerular filtrate is A) 150-170 lit B) 170-180 lit C) 180-190 lit D) 190-200 lit	B
9	K	Blood supply to the kidneys per minute is A) 1000 ml B) 1200 ml C) 1300 ml D) 1400 ml	B
10	K	The amount of water excreted from our body in 24 hours is A) 1 lit B) 1.2 lit C) 1.4 lit D) 1.5 lit	D
11	K	The amount of urea excreted from our body in 24 hours is A) 30 gms B) 31 gms C) 5 gms D) 2 gms	A

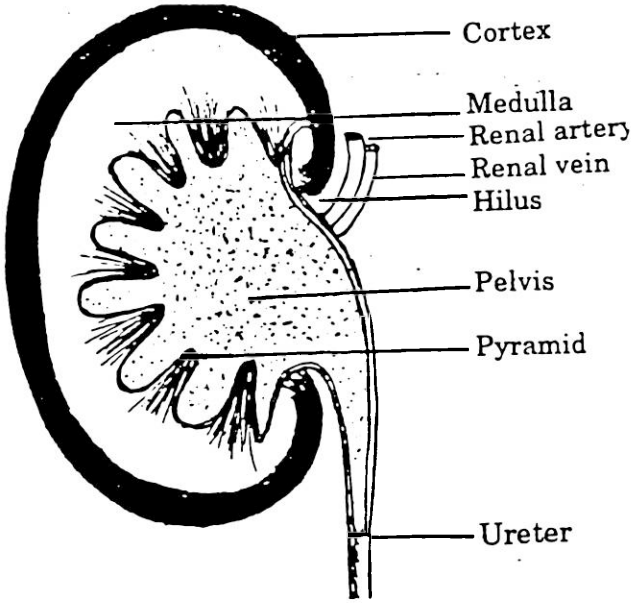
Q. No.	Obj.	Questions	Answers
12	K	The amount of glucose reabsorbed in the glomerular filtrate in 24 hours is A) 560 gm B) 555 gm C) 170 gm D) 27 gm	C
13	K	The amount of sodium in the glomerular filtrate in 24 hours is A) 560 gm B) 170 gm C) 29 gm D) 51 gm	A
14	K	The amount of sodium reabsorbed in the glomerular filtrate in 24 hours is A) 170 gm B) 555 gm C) 27 gm D) 21 gm	B
15	K	In the proximal convoluted tubule the urine is found to be A) isotonic B) hypotonic C) hypertonic	

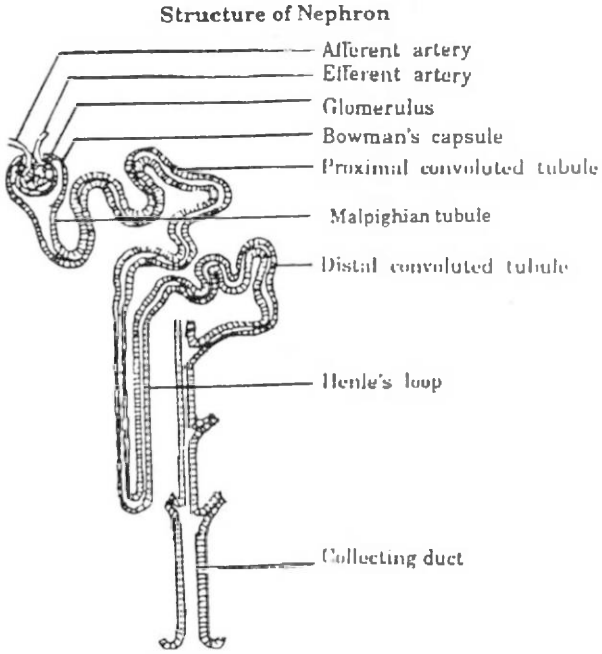
Q. No.	Obj.	Questions	Answers
16	K	The medulla of kidney shows a number of cone shaped masses called A) renal pyramids B) calyces C) pelvis D) renal columns of Bertini	A
17	U	The sequence in the formation of urine is A) selective reabsorption B) tubular secretion C) glomerular filtration	C
18	K	The length of the uriniferous tubule of man measures A) 45 to 50 mm B) 40 to 50 mm C) 60 to 50 mm D) 55 to 60 mm	C
FILL IN THE BLANKS			
1	U	The chief excretory organs are_____.	kidneys
2	K	The nitrogenous wastes are excreted through_____.	kidneys
3	K	The tough transparent membrane covering the kidney is_____.	capsule
4	K	The depression found in the middle of the inner concave region of the kidney is known as_____.	hilus
5	U	The outer dark region of the kidney is _____.	cortex

Q. No.	Obj.	Questions	Answers
6	U	The inner pale region of the kidney is _____.	medulla
7	K	The cone shaped masses in the medulla are called_____.	renal pyramids
8	K	The renal pelvis projects in between the pyramids in the form of finger like foldings called_____.	colyx
9	K	The structural and functional units of the kidney are_____.	nephrons
10	K	The double walled cup-like structure of the malphighian capsule is called _____.	Bowmann's capsule
11	K	_____ and_____ constitute the malphighian capsule	Glomerulus & Bowmann's capsule
12	K	The 'U' shaped region of the urini-ferous tubule is known as_____.	Henle's loop
13	K	The ascending limb of Henle's loop gives rise to_____.	the distal convoluted tubule
14	K	The collecting tubes open into a larger tube known as_____.	duct of Bellini
15	U	In the proximal convoluted tubule the urine is found to be_____.	isotonic
16	K	The amount of water reabsorbed in uriniferous tubules in 24 hours is _____.	170 lit
17	U	The urine becomes less hypertonic since _____ is actively transported from the ascending limb to the descending limb.	sodium
18	K	In 24 hours the total volume of glamerular filtrate is_____.	170-180 lit
19	K	_____ serves as a reservoir of the urine.	urinary bladder

Q. No.	Obj.	Questions	Answers
20	K	The canal passing from the neck of the urinary bladder to the external opening is_____.	urethra
21	U	The osmotic pressure in blood and tissue is maintained by_____.	kidney
MATCH THE FOLLOWING			
	U	1. Malphighian body	a. Duct of Bellini	1-b
	U	2. Reservoir	b. Biological filter	2-d
	U	3. Collecting tube	c. Descending limb of Henle's loop	3-a
	U	4. Proximal convoluted tubule	d. Urinary bladder	4-e
	U	5. Hypertonic	e. Brush border	5-c
			f. Descending limb of Henle's loop	
VERY SHORT ANSWERS			
1	K	What is excretion ? Ans: The process of eliminating cellular wastes.	
2	U	Mention some of the excretory products. Ans: CO_2, undigested food materials, excess of water, salts and nitrogenous products of protein catabolism.	
3	U	Why is the right kidney level lower than the left ? Ans: Because the right side of the abdominal cavity is occupied by the liver.	
4	K	What is the measurement of each kidney? Ans: 11 cm in length, 6 cm in breadth and 3 cm in thickness.	
5	U	What is hilus ? Ans: The depression found int he middle of the inner concave region of the kidney	

Q. No.	Obj.	Questions	Answers
6	U	What is renal pelvis ? Ans: The ureter entering through the hilus, expands and forms a wide funnel shaped structure called renal pelvis.	
7	U	What are calyces ? Ans: The renal pelvis projects in between the pyramids in the form of finger like foldings called calyces.	
8	U	What are renal columns of Bertini ? Ans: The cortical tissue extending in between the pyramids forms the renal columns of Bertini.	
9	U	What Bowman's capsule is made of ? Ans: Double walled cup like structure of the malphigian capsule.	
10	U	What is glomerulus ? Ans: The Bowman's capsule encloses a bunch of afferent and efferent arterioles called glomerulus.	
11	U	What are the parts of a uriniferous tubule ? Ans: 1. Proximal convoluted tubule 2. Henle's loop 3. Distal convoluted tubule	
12	U	Mention the processes involved in the urine formation. Ans: 1. Glomerular filtration 2. Selective absorption 3. Tubular secretion	
13	U	Give reasons for the active glomerular filtration. Ans: 1. Having pores in the malphighian body 2. The tuft of capillries increasing the surface 3. The efferent arteriole is narrower than the afferent arteriole.	

Q. No.	Obj.	Questions	Answers
14	U	What are the substances reabsorbed in the proximal convoluted tubule ? Ans: Water, glucose, pot. phosphate and bicarbonates	
15	U	Define hypertonic and hypotonic. Ans: A solution is hypertonic when water passes into it across a membrane and the solution from which water is lost is called hypotonic.	
16	U	Explain tubular secretion. Ans: This is the final step in urine formation during which the epithelial cells of the tubule actively remove additional wastes from the blood that have escaped filtration.	
17	K	What are the substances present in urine ? Ans: 1. Water, 2. Urea, 3. Metabolic products	
LONG ANSWERS			
1	S	Draw a neat and labelled diagram of V.S. of a kidney.  	

Q. No.	Obj.	Questions	Answers
2	U	Explain the internal structure of kidney.	
		Ans: 1. Cortex and medulla, 2. renal pelvis, 3. renal pyramids, 4. calyces, 5, renal columns of Bertini, 6. Nephrons.	
3	S	Draw a neat and labelled diagram of a nephron.	
			
4	U	Explain the structure of a uriniferous tubule.	
		Ans: 1. A short neck, 2. proximal convoluted tubule, 3. Henle's loop, 4. distal convoluted tubule, 5. collecting tube, 6. duct of Belini.	
5	U	What are the functions of kidney ?	
		Ans: 1. Maintaining the fluid and electrolyte balance. 2. Regulating acid-base balance of blood. 3. Maintaining the osmotic pressure in blood and tissue. 4. Excreting urea. 5. Regulating the loss of water in excess. 6. Retaining important plasma constituents.	
6	U	Explain glomerular filtration.	
		Ans: 1. Malphighian as biological factor, 2. Factor for active filtration, 3. Blood supply to the kidneys, 4. Pressure of blood at the afferent glomerular arteriole, 5. Volume of filtrate.	

Q. No.	Obj.	Questions	Answers
7	U	Tabulate renal filtration and reabsorption in 24 hours. Ans:	

Summary of renal filtration and reabsorption in 24 hours.

No.	Constituent	Glomerular filtrate	Reabsorbed in tubules	Excreted
1.	Glucose	170 gm	170 gm	—
2.	Sodium	560 gm	555 gm	5 gm
3.	Potassium	29 gm	27gm	2 gm
4.	Calcium	17 gm	16.8 gm	0.2 gm
5.	Urea	51 gm	21 gm	30 gm
6.	Water	170 lit.	168.5 lit.	1.5 lit

TOPIC 22 : NERVOUS SYSTEM

CONTENT POINTS: Brain structure and functions
Spinal chord, structure and functions

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	The weight of the human brain is A) 1.26 kg B) 1.30 kg C) 1.36 kg D) 1.46 kg	C
2	K	The outer tough brain membrane is A) duramater B) meninges C) piamater D) arachnoid membrane	A
3	K	Thalamus is a part of A) infundibulum B) hypophysis C) corpus striatum D) diencephalon	D
4	K	The inferior surface of the diencephalon bears A) optic chiasma B) corpus striatum C) corpus callosum D) hypophysis	A

Q. No.	Obj.	Questions	Answers
5	K	How many spherical centres are present in the midbrain ? A) 2 B) 4 C) 6 D) 8	A
6	K	Optic orientation is the function of A) fore brain B) hind brain C) cerebrum D) mid brain	D
7	K	The posterior most part of the brain is called A) prosencephalon B) rhombencephalon C) diecncephalon D) mesencephalon	B
8	K	The well marked deep depression of cerebellum is called A) pons B) vermis C) peduncle D) vallecula	D

Q. No.	Obj.	Questions	Answers
9	K	The middle part of the brain is A) pons B) cerebellum C) medulla oblengata D) vermis	A
10	K	The number of spinal nerves in man is A) 30 pairs B) 32 pairs C) 31 pairs D) 33 pairs	C
11	U	The thalamus and the hypothalamus bind A) lateral ventricle B) second ventricle C) third ventricle D) fourth ventricle	C
12	K	The cortex part of the frontal lobe and the most temporal lobe are concerned with A) psychic B) visual C) auditory D) balance	A
13	U	Which of the following parts is concerned with auditory function ? A) occipital B) frontal C) temporal D) parietal	C

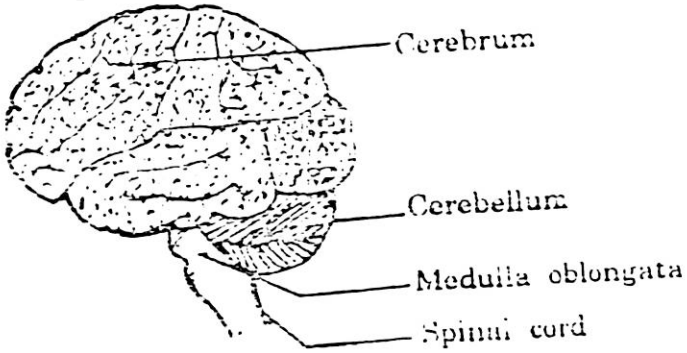
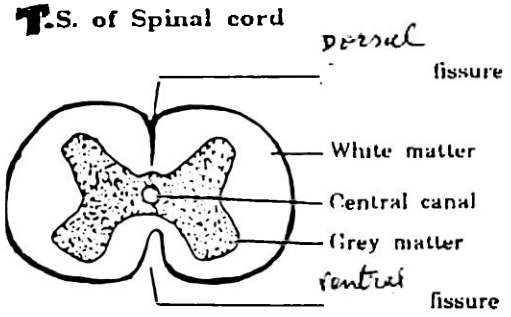
Q. No.	Obj.	Questions	Answers
14	U	Which of the following parts is concerned with visual function ? A) Occipital B) Parietal C) Frontal D) Temporal	A
15	U	Which part of the brain governs the postural mechanism of the body ? A) Cerebrum B) Cerebellum C) Medulla oblongata D) Mid brain	B
16	K	The control of respiration and circulation is governed by A) cerebrum B) cerebellum C) pons D) medulla oblongata	D
17	K	Total volume of cerebrospinal fluid in man is A) 100-120 ml B) 100-130 ml C) 90-150 ml D) 100-150 ml	D

Q. No.	Obj.	Questions	Answers
18	K	The rate of formation of cerebrospinal fluid in man per hour is A) 20 ml B) 25 ml C) 30 ml D) 26 ml	A
19	U	Which of the following is more in cerebrospinal fluid ? A) Proteins B) Aminoacid C) Magnesium D) Cholesterol	C
20	U	Which of the following is almost same or less in C.S.F. as in plasma ? A) Chloride B) Magnesium C) Protein D) Sodium	D
FILL IN THE BLANKS			
1	K	The functional unit of nervous system is_____.	neuron
2	K	The study of nervous system is called _____.	neuro-physiology
3	K	The two cerebral hemispheres are united at their base by_____.	corpus callosum
4	K	The hind part of the prosencephalon is the_____.	diencephalon

Q. No.	Obj.	Questions	Answers
6	K	The largest part of the hind brain is _____.	cerebellum
7	K	The pons and the spinal chord are connected by_____.	medulla oblongata
8	K	Each lateral ventricle communicates with the III ventricle through_____.	foramen of monro
9	K	The III and IV ventricles are connected by_____.	cerebral aquiduct
10	K	The conditioned reflect action experiment in dog was conducted by _____.	Pavlov
11	K	The subarachnoid space is enlarged in certain regions to form_____.	cisterns
12	K	Cerebrospinal fluid is a special filtrate of_____.	plasma
MATCH THE FOLLOWING			
		A / B	
	K	1. Temporal lobe — a. Spinal chord	1-c
		2. Optic — b. Respiration	2-e
		3. Cauda equina — c. Auditory	3-a
		4. Medulla oblongata — d. Psychic, e. Visual	4-b, 5-g
		5. Corpus callosum — f. Cerebellum, g. Cerebrum	
SHORT ANSWERS			
1	U	The nervous system is very essential for any organism. Why ? Ans: 1. division of labour, 2. control, 3. coordination, 4. integrate	
2	K	What are the two type of the human nervous system ? Ans: 1. Central and 2. Peripheral	

Q. No.	Obj.	Questions	Answers
3	K	Mention the three parts of brain. Ans: 1.Prosencephalon,2. Mesencephalon, 3. Rhombencephalon.	
4	U	What is corpus callosum ? Ans: 1. Nervous tissue, 2. Connects the two cerebral hemispheres	
5	U	What are sulci and gyri ? Ans: Convolutions and elevations in brain.	
6	U	What are basal ganglia ? Ans: 1. Grey matter and 2. Cerebral hemispheres	
7	U	What are the four regions of the cerebrum based on the functions ? Ans: 1.Frontal,2. Parietal,3. Temporal, 4. Occipital.	
8	U	What is corpus striatum ? Ans: 1. Grey matter,2.Anterior thalamus	
9	U	Point out the functions of thalamus. Ans: 1. Sensory impulse and coordination of motor and 2. Coordination of autonomous.	
10	K	Mention the three parts of the rhombencephalon. Ans: 1. Cerebellum, 2. Pons, 3. Medulla oblongata.	
11	U	What is conus medullaries ? Ans: Conical extremity of the spinal chord.	

Q. No.	Obj.	Questions	Answers
12	U	What is cauda equina ? Ans: 1. Below the conus medullaries and 2. extension of spinal chord.	
13	K	What is filum terminal ? Ans: 1. Last part of the spinal chord and 2. Bundle of nerves.	
14	K	Define reflex action. Ans: 1. Involuntary,2. Sensory stimulus and 3. Spinal chord	
15	K	Define reflex arc. Ans: Combination of structure governing reflex action.	
16	U	Distinguish between plasma and cerebrospial fluid. Ans: 1. Chloride and 2. Proteins amino acids and cholesterolless.	
17	U	Where is the choroid plexus located ? What is its function ? Ans: 1. Roof of the diencephalon and 2. Formation of C.S.F.	
18	U	Point out any two functions of cerebrospinal fluid. Ans: 1. Buoyancy, 2. Nourishment, 3. Shock absorber & 4. Mechanical buffer.	

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	S	Draw a neat diagram of the structure of brain and label the parts.	
2	U	Describe the structure of human brain. Ans: Cerebrum, mid brain and medulla oblongata.	
3	U	With a neat diagram describe the structure of spinal chord. Ans: 1. Diagram of C.S. of spinal chord. 2. Grey and white matter 3. Afferent nerves 4. Efferent nerve 5. Dorsal root ganglion.	
4	U	List the functions of the cerebrum. Ans: 1. Cortex part of the frontal, 2. occipital, 3. temporal, 4. cortex of the parietal, 5. the posterior and superid part of the frontal, 6. intelligence, 7. cerebral cortex is the origin of voluntary muscular activities.	
5	U	Give an account of the functions of the spinal chord. Ans: 1. Communication between brain and all parts of the body, 2. Reflex action and 3. Reflex arc.	
6	U	Describe the conditioned reflex explained by Pavlov ? Ans: 1. CS, 2. CR, 3. UCS and 4. UCR.	

TOPIC 23 : ENDOCRINE SYSTEM

CONTENT POINTS: Principles, all the endocrine glands and their secretion.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Which one of the following is an endocrine gland ? A) Salivary gland B) Liver C) Thymus D) Gastric gland	C
2	K	The weight of the pituitary gland is A) 0.5-1 gm B) 1-1.5 gm C) 1.5-1.8 gm D) 2-3 gm	A
3	K	Pituitary gland is in communication through hypothalamus with the floor of the A) I ventricle B) III ventricle C) II ventricle D) IV ventricle	B
4	K	The average dimensions of the pituitary gland is A) 10x4x13 mm B) 10x6x13 cm C) 10x4x13 cm D) 10x6x13 mm	D

Q. No.	Obj.	Questions	Answers
5	K	Adenohypophysis which is the anterior lobe of pituitary is A) glandular B) muscular C) nervous D) epithelial	A
6	K	Neurohypophysis which is the posterior lobe of pituitary is A) glandular B) muscular C) nervous D) epithelial	C
7	K	The vascular zone between the adeno-hypophysis and neurohypophysis of pituitary is A) pars nervosa B) pars intermedia C) pars distalis D) pars tuberalis	B
8	U	The bulk of adenohypophysis is A) pars nervosa B) pars intermedia C) pars distalis D) pars tuberalis	D
9	U	The thickness of lower jaw, hand and feet is a symptom in adults is called A) midget B) gigantism C) acromegaly D) myxedema	C

Q. No.	Obj.	Questions	Answers
10	K	Less secretion of somatotropic hormone in children causes A) midget B) gigantism C) myxedema D) acromegaly	D
11	K	Excess secretion of somatotropic hormone in children causes A) cretinism B) gigantism C) midget D) myxedema	B
12	U	Which of the following is not a gonadotropic hormone ? A) Luteinising hormone B) F.S.H. C) L.T.H. D) Oxytocin	D
13	K	The hormone that stimulates both the ovary and testis in man is A) F.S.H. B) ICSH C) L.T.H. D) Prolactin	A
14	K	Which of the following horrmones is associated with lactation in females A) FSH B) LH C) Prolactin D) Vassopressin	C

Q. No.	Obj.	Questions	Answers
15	U	Which causes rhythmic contraction of uterus ? A) Gonadotropin B) Oestrogen C) L.T.H. D) Oxytocin	D
16	K	The glands lying one on either side of the larynx in the neck region is A) thyroid B) pituitary C) thymus D) pineal	A
17	K	The gland derived by a downward growth of pharyngial epithelium is A) pituitary B) adenohypophysis C) thyroid D) neurohypophysis	C
18	K	Each acinus is lined by A) cubical epithelium B) columnar ciliated epithelium C) columnar epithelium D) granular cubical epithelium	D

Q. No.	Obj.	Questions	Answers
19	K	The mineral present in thyroxine is A) calcium B) magnesium C) sodium D) iodine	D
20	K	The percentage of iodine present in thyroxine is A) 60% B) 65% C) 75% D) 85%	B
21	U	Protrusion of eye balls and reduction of body weight is cause due to A) goitre B) exophthalmic goitre C) simple goitre D) endemic goitre	B
22	U	Goitres occurring in iodine deficiency areas are called as A) endemic B) toxic C) exophthalmic D) sporadic	A

Q. No.	Obj.	Questions	Answers
23	K	The gland that develops as an external outgrowth of the 3rd and 4th pharyngial pouches is A) thyroid B) pituitary C) parathyroid D) thymus	C
24	K	The number of amino acids present in parathormone is A) 51 B) 80 C) 81 D) 95	B
25	K	In addition to calcium metabolism parathormone controls the metabolism of A) sodium B) potassium C) magnesium D) phosphate	D
26	K	Parathormone controls the level of the mineral in blood A) sodium B) calcium C) potassium D) magnesium	B

Q. No.	Obj.	Questions	Answers
27	K	Parathormone enhances the excretion of the following mineral in the kidney. A) Sodium B) Magnesium C) Sugar D) Phosphate	D
28	K	Spasms of muscles, hands, feet, larynx and muscular convolusions are the symptoms of A) tetany B) cretinism C) myxedema D) diabetes	A
29	K	The gland that functions as exocrine as well as endocrine gland A) Pituitary B) Thyroid C) Adrenal D) Pancreas	D
30	K	The number of amino acids present in insulin A) 40 B) 48 C) 51 D) 61	C

Q. No.	Obj.	Questions	Answers
31	K	Increased blood glucose level is called A) Hyperglycemia B) Diabetes mellitus C) Hypoglycemia D) Ketosis	A
32	K	A diabetic patient excretes large amount of urine and this is called A) polyurea B) polyphagia C) polydipsia D) ketosis	A
33	K	Consumption of large quantity of water by a diabetic patient is termed as A) polyurea B) polydipsia C) ketosis D) polyphagea	B
34	K	A diabetic patient eating excessively is A) polyurea B) polydipsia C) polyphagea D) ketosis	C

Q. No.	Obj.	Questions	Answers
35	U	Which of the following is a hyperglycemic hormone ? A) Glucagon B) Insulin C) Calcitonin D) Aldosterone	A
36	U	Which of the following is a hypoglycemic hormone ? A) Insulin B) Glucagon C) Calcitonin D) Aldosterone	A
37	K	The adrenal glands are associated with the organ. A) Larynx B) Pharynx C) Brain D) Kidney	D
38	K	Aldosterone promotes the reabsorption of A) K ions B) Na^{+} C) Mg^{++} D) Ca^{++}	B

Q. No.	Obj.	Questions	Answers
39	K	The hormone that is associated with emergency A) Noradrenalin B) Insulin C) Adrenalin D) Aldosterone	C
40	K	Testosterones are produced under the influnce of A) F.S.H. B) ICSH C) Oxytocin D) STH	B
41	K	The corpus leuteum produces the steroid hormone called A) Oestrogen B) Testosterone C) Progesterone D) Oxytocin	C
42	K	Relaxin is secreted by A) follicle cells B) corpus leuteum C) ovary D) testis	B
43	K	The endocrine gland associated with immunological processes in any body is A) thymus gland B) islets of Langerhans C) adrenal gland D) pituitary	A

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	K	Hormones are referred to as_____.	chemcial coordinators
2	K	Hormone is a chemical substance directly gets into_____ which regulates activity of distant parts.	blood stream
3	K	The adenohypophysis of pituitary develops from the_____.	primitive mouth
4	K	The neurohypophysis develop from the ventral wall of_____.	hypothalamus
5	K	ADH is otherwise called as_____	Vassopressin
6	K	The two lobes of thyroid gland are connected by_____.	Isthmus
7	K	The follicles of thyroid gland are also called as_____.	Acini
8	K	The only amino acid present in thyroxine is known as_____.	Tyrosine
9	K	The deficiency of thyroxine in childhood leads to_____.	Cretinism
10	K	Hypthyroidism in adults leads to_____.	Myxedema
11	K	The Grave's disease is otherwise called as_____.	exophthalmic goitre
12	K	The enlargement of thyroid gland is called_____.	goitre
13	K	Exopthalmic goitre is a type of_____.	toxic goitre
14	K	Hypersecretion or_____ of the thyroid gland results in hyperthyroidism.	enlargement
15	K	Parathyroid glands secrete mainly _____.	Parathormone
16	K	Parathyroid glands secrete_____ hormone in addition to parathormone.	Calcitonin

Q. No.	Obj.	Questions	Answers
17	K	Removal of parathyroid gland leads to the disease_____.	tetany
18	K	Calcitonin functions opposite to_____.	Parathormone
19	K	Alpha cells of the Islets of Langerhans secrete_____.	glucagon
20	K	Beta cells of the Islets of Langerhans secrete_____.	insulin
21	K	Excess of glucose eliminated along with the urine is called_____.	diabetes mellitus
22	K	Excess secretion of insulin _____ blood sugar level.	lowers
23	K	The cells of zona fasciculata and zona reticularis collectively secrete_____.	gluco-corticoids
24	K	Zona glomeerulosa secretes_____.	minerals corticoids
25	K	The major steroid mineralo corticoid hormone is_____.	aldosterone
26	K	The major steroid glucocorticoid hormone is_____.	cortisone
27	K	Cortisone acts as an_____ agent.	anti-inflammatory
28	K	Between the chords of sperm producing cells_____ are present.	interstitial cells of Leydig
29	K	Testosterone and other male sex hormones are collectively called as _____.	androgens
30	K	Under the influence of FSH the follicle cells of the ovary produce a steroid hormone called_____.	Oestrogen
31	K	_____ gland lies anterid to the heart.	Thymus

Q. No.	Obj.	Questions	Answers
MATCH THE FOLLOWING			
		A B	
1	K	1. Pituitary a. Larynx 2. Islets of Langerhans b. Kidney 3. Thymus c. Trachea 4. Adrenal d. Pancreas 5. Thyroid e. Heart f. Brain g. Lung	1-f 2-d 3-e 4-b 5-a
		A B	
2	K	1. Myxedema a. Insulin 2. Tetany b. S.T.H. 3. Midget c. Thymus 4. Myasthenia Gravis d. Parathormone 5. Diabetes mellitus e. Calcitonin f. Adrenalin g. Thyroxine	1-g 2-d 3-b 4-c 5-a
SHORT ANSWERS			
1	U	Distinguish beween enzymes and hormones. Ans: 1. glands with duct, ductless gland, 2. hormones are transported by the blood. Enzymes are not transported by blood.	
2	U	List the main funtion of hormones. Ans: 1. Metabolic activities and 2. bring about the physiological balance.	
3	U	Point out the methods which help us to study about the endocrine glands. Ans: 1. Removal and their effects, 2. Reimplanation and effects, 3. Isolation and purification of the hormone, 4. Synthesis.	
4	U	List out the three parts of the adenohypophysis of the pituitary. Ans: pars distalis, pars intermedia and pars tuberalis.	

Q. No.	Obj.	Questions Answers
5	U	How is midget caused ? Ans: Less secretion of STH in children.
6	U	What is acromegaly ? Mention its symptoms. Ans: 1. Less STH in adults and 2. Thickness of lower jaw, hands and feet.
7	U	List the function of ADH. Ans: 1. Water balance and 2. Blood pressure.
8	U	Why is ADH otherwise called as vassopressin ? Ans: 1. Capillary constriction and 2. Raise blood pressure.
9	U	Why is oxytocin important in females ? Ans: 1. Contraction of uterus and 2. Lactation.
10	U	Where is the thyroid gland located ? Point out its secretion. Ans: 1. Larynx and 2. Thyroxine.
11	K	What is acinus ? What does it contain ? Ans: 1. Follicles of thyroid and 2. Contain thyroxine which is a colloid.
12	U	What is BMR ? Ans: 1. Cellular oxdination, 2. metabolic, 3. amount of heat produced in a given time.
13	U	List the functions of the thyroid gland. Ans: 1. Normal growth and 2. BMR.
14	U	How a child suffering from cretinism is identified ? Ans: 1. Growth arrested, 2. mental defect, 3. dry skin and 4. BMR low.
15	U	What are the symptoms of myxedema ? Ans: 1. Dry skin with loss of hair, 2. expressionless face, 3. mental sluggishness, 4. BMR low.

Q. No.	Obj.	Questions Answers
16	U	Point out the two types of goitre. Ans: 1. Simple and 2. Toxic.
17	K	Give the location of the parathyroid gland. Ans: 1. Two pairs and 2. anterid and posterid parts of thyroid.
18	U	List the functions of parathormone. Ans: 1. Ca & PO_4 metabolism, 2. deposition of Ca and PO_4, 3. Ca level in the blood, 4. excretion of PO_4
19	U	What is tetany ? Ans: 1. Removal of parathyroid gland and 2. Spasms.
20	U	What are the functions of insulin ? Ans: 1. Conversion of glucose to glycogen, 2. Oxidation of glucose and 3. Storage.
21	U	Glucagon is called as hyperglycemic hormone. Why ? Ans: 1. Converts glycogen --> glucose and 2. raises the blood glucose levels.
22	K	Mention the three zones of adrenal cortex. Ans: a. Zona glomerulose, b. Zona fasciculata and c. Zona reticularis.
23	U	List the functions of cortisone. Ans: 1. Production of glucose from non-carbohydrates, 2. decreases glucose utilisation,3. anti-inflammatory
24	U	Mention the actions of testosterone. Ans: 1. Development of male sex organ & 2. secondary sexual characters in male.
25	U	List the actions of progesterone. Ans: 1. premenstrual growth, 2. developmental of palcenta and 3. changes in pregnancy.

Q. No.	Obj.	Questions Answers
26	U	What is myasthenia gravis ? Ans: Thymic tumour
27	U	Point out the actions of oestrogen. Ans: 1. Growth of female reproductve organs and 2. seconary sexual characters in female.
LONG ANSWERS		
1	U	List out the general principles of hormones. Ans: 1. Small quantities, 2. modifies metabolic activity, 3. specific stimulus, 4. independent, 5. catalytic, 6. target, 7. continuously excreted, 8. proteins in nature, 9. artificially synthesised, 10. extracted.
2	U	Describe the structure of pituitary gland. Ans: 1. adenohypophysis origin and pars distalis, pars intermedia, pars tuberalis and 2. neurohypophysis and origin.
3	U	List the hormones secreted by pituitary gland. Ans: Adenohypophysis:1. STH, 2. ACTH, 3. TSH, 4. FSH, 5. ICSH or LH, 6. LTH. Neurohypophysis: 1. Oxytocin and 2. Vasopressin.
4	U	Describe the functions of STH. Ans: 1. Metabolism and growth, 2. Protein synthesis, 3. Amino acid transport increased,4. Fat utilisation, 5. Retention of N, K, P and Na ions, 6. Stimulates insulin secretion.
5	U	What is feedback mechanism ? Explain with an example. Ans: 1. Central of one hormone on the secretion of another, 2. eg. T.S.H., ACTH, 3. releasing factors, 4. stimulate, 5. inhibit.
6	U	Write notes on hypothyroidism. Ans: 1. Less secretion, 2. in child cretinism, 3. in adult myxedema, 4. goitre.

Q. No.	Obj.	Questions Answers
7	U	List the symptoms of Grave's disease. Ans:1. Increase the size of thyroid gland,2. increase metabolism, 3. excitability of nerves, 4. increase of heart beat, 5. eye ball protrusion, 6. reduction of body weight.
8	U	Give an account of parathyroid gland. Ans: 1. location, 2. origin, 3. hormone, 4. hypoparathyroidism, 5. hyper.
9	U	Write note on a: hyperglycemia and b. hypoglycemia. Ans: 1. Increase in blood glucose, 2. diabetes mellitus, 3. polyurea, polyphagia, polydipsia, ketosis, 4. decrease in blood glucose, 5. serious consequences.
10	U	What are the parts of adrenal cortex ? List the hormones secreted by them and their actions. Ans: 1. Zona glemerulosa, zona fasciculata, zona reticularis, 2. glucocorticoid stimulates the production of glucose from non-carbohydrates-cortisone, 3. mineralocorticoids promote the reabsorption of sodium-Aldosterone.
11	U	List the actions of adrenalin. Ans: 1. Constriction of blood vessels, 2. increase the rate amplitude and frequency of heart beat, 3. relaxation of smooth muscles, 4. relaxation of bronchi, dialation of pupil, increase sweating, 5. hairs standing on the skin, 6. accelerates perspiration, 7. increase oxygen consumption.

UNIT V : GENETICS

TOPIC 24 : MENDELISM

CONTENT POINTS : Mendelism, Monohybrid experiment, dihybrid experiment, back cross

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	Who is known as "father of genetics" ?	C
		A. Linnaeus	
		B. T.H. Morgan	
		C. Mendel	
		D. Hygo de vries	
2	K	Mendel belongs to	A
		A. Czechoslovakia	
		B. Germany	
		C. U.S.A.	
		D. Switzerland	
3	U	Mendel published the results of his experiments on heredity in	B
		A. 1855	
		B. 1865	
		C. 1876	
		D. 1900	
4	K	Mendel's principles were redicovered in	C
		A. 1800	
		B. 1865	
		C. 1900	
		D. 1956	

Q. No.	Obj.	Questions	Answers
5	U	The monohybrid-phenotypic ratio obtained by Mendel A. 2:1:1 B. 1:2:1 C. 9:3:3:1 D. 3:1	D
6	K	The genotypic ratio of Mendel's monohybrid experiment is A. 3:1 B. 9:3:3:1 C. 1:2:1 D. 1:1:1:1	C
7	U	How many different contrasting characters did Mendel observe in the pea plant ? A. 5 pairs B. 5 pairs C. 6 pairs D. 7 pairs	D
8	U	The phenotypic ratio of Mendel's dihybrid experiment. A. 3:1 B. 12:3:1 C. 9:7 D. 9:3:3:1	D

Q. No.	Obj.	Questions	Answers
9	K	The ratio obtained as a result of monohybrid test cross. A. 1:1 B. 3:1 C. 1:2:1 D. 1:1:1:1	A
10	K	The dihybrid recessive back cross ratio is A. 9:3:3:1 B. 1:1:1:1 C. 12:3:1 D. 1:1	B
11	U	In a dihybrid cross how many offsprings obtained are with new combination of genes. A. 2 B. 6 C. 14 D. 16	C
FILL IN THE BLANKS			
1	K	Genetics a branch of biology began as study of_____.	heredity
2	K	Mendel selected the plant_____ for his genetic experiments.	Pisum sativum
3	U	A cross between unlike parents produces an offspring called_____.	Hybrid
4	K	The factor that suppresses the expression of the other factor is called as_____.	dominant

Q. No.	Obj.	Questions	Answers
5	U	The factor which is suppressed in the F_1 generation in Mendel's experiment is called_____.	recessive
6	U	In modern genetics the factor of Mendel is called as_____.	gene
7	U	The alternative form of a gene that is present at a particular locus in a chromosome is_____.	allele
8	U	The law of segregation is otherwise called as_____.	law of purity of gamates
9	K	The expression of body character is called as_____.	Phenotype
10	K	The expression of genes in relation to body character is_____.	genotype
11	U	A cross between the F_1 individual with their recessive parent is called as _____.	test cross
12	U	Recessive back cross is otherwise called as_____.	test cross

MATCH THE FOLLOWING

	U	A	B	
		1. Hugodevries	a. Gene	1-e
		2. Correns	b. Test cross	2-c
		3. Factor	c. Germany	3-a
		4. Homozygous	d. TT	4-d
		5. Recessive backcross	e. Holland	5-b

SHORT ANSWERS

1	U	Give the reasons for Mendel selecting <u>Pisum sativum</u> for his experiments. Ans: 1. Many pure breeding varieties 2. Self pollinating plants 3. Fertile hybrids

Q. No.	Obj.	Questions	Answers
2	U	Define monohybrid cross.	
		Ans: 1. Cross between two different varieties 2. Single pair of contrasting character	
3	U	What is meant by homozygous condition and heterozygous condition ?	
		Ans: 1. Both the factors same 2. The factors in the homologous chromosome difference	
4	U	What are allelomorphs ?	
		Ans: The characters expressed by the alleles.	
5	U	Define law of seggregation.	
		Ans: 1. Factors brought together in the hybrid 2. Separation of the factors	
6	U	Define dihybrid cross.	
		Ans: 1. Two different plants 2. Two pairs of contrasting characters	
7	U	Define the law of independent assortment.	
		Ans: 1. The genes for different characters do not stay together. 2. Assort themselves	
8	U	What is back cross ?	
		Ans: Cross between F_1 offspring with any one of the parent.	
LONG ANSWERS			
1	U	Describe monohybrid cross experiment.	
		Ans: 1. <u>Pisum sativum</u>	
		2. Single pair of contrasting characters T, t	
		3. F_1 hybrid	
		4. Selfing	
		5. F_2 phenotypic and genotypic ratio	

Q. No.	Obj.	Questions Answers
2	U	List the contrasting of characters observed by Mendel in Pisum sativum Ans: 1. Round x Wrinkled 2. Yellow seeds x Green seeds 3. Grey brown seed coat x White seed coat 4. Inflated pod x Constricted pod 5. Green pod x Yellow pod 6. Axial flower x Terminal flower 7. Long stem x Short stem
3	U	Explain Mendel's dihybrid cross experiment. Ans: 1. Round yellow x Green winkled 2. F_1 all round yellow hybrid 3. Selfing - independent assortment forming from types of gametes 4. F_2 new combination 5. 9:3:3:1 ratio
4	U	Explain test cross Ans: 1. Recessive backcross 2. One parent heterozygous dominant One parent homozygous recessive 3. 1:1 ratio

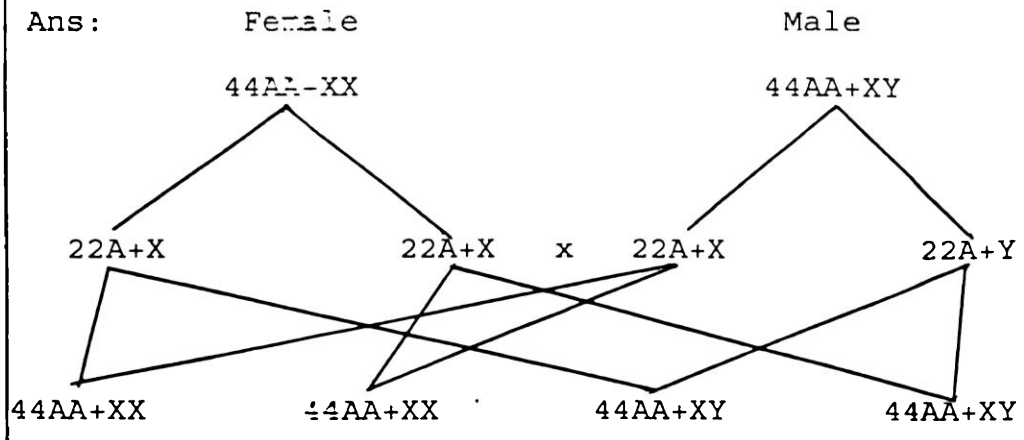
TOPIC 25 : SEX DETERMINATION

CONTENT POINTS : Chromosomal theory of sex determination - Genic balance theory or ratio theory of sex determination - Sex determination by environment - Sex determination by harmones.

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	Diploid cells of human beings have A. 49 chromosomes B. 46 chromosomes C. 53 chromosomes D. 67 chromosomes	B
2	U	Genic balance theory was studied in Drosophila by A. Mendel B. T.H. Morgan C. Calvin B. Bridges D. Hugodevries	C
3	U	Diploied cells of Drosophila have A. 8 chromosomes B. 6 chromosomes C. 12 chromosomes D. 4 chromosomes	A
4	U	Which is the factor that determines sex in man ? A. Chromosomes B. Environment C. Antrogen D. Autosome	A

Q. No.	Obj.	Questions	Answers
5	U	Which one of the following factors determines sex in Bonelia ? A. Hormones B. Environment C. Chromosomes D. X chromosome	B
FILL IN THE BLANKS			
1	U	The presence of testis in male and ovary in female is refered to as _____.	primary sexual character-istics
2	U	The morphological characteristics of male and female are known as_____.	secondary sexual character-istics
3	U	In man the method of sex determination by chromosomes is_____.	XX-XY method
4	U	The normal chromosomal number in man is _____.	46
5	U	_____ and_____ are the two types of sex chromosomes in human beings.	X and Y chromosomes
6	U	In human being the sex chromosomes of female are_____.	two X chromosomes
7	U	In human being the sex chromosomes of male are_____.	X chromosome and Y chromosome
8		Sex determination by environment is well illustrated in a marine worm _____.	Bonellia
9		Chromosomes which determine the body characters are known as_____.	autosomes

Q. No.	Obj.	Questions		Answers
MATCH THE		FOLLOWING		
		A	B	
		1. Calvin B. Bridges	a. Autosomes	1-d
		2. F. Baltyer	b. Male harmone	2-e
		3. Body character	c. Human being	3-a
		4. Androgen	d. Genic balance theory	4-b
		5. 46 chromosomes	e. Bonellia	5-c
SHORT QUESTIONS				
1	U	What is sexual dimorphism ?		
		Ans: The phenomenon in which male and female organisms differ morphologically, anatomically & physiologically is known as sexual dimorphism.		
2	U	Mention some factors determining sex.		
		Ans: Chromosomes, environment and harmones		
3	U	Give two examples in which the sex determination is studied by chromosomes.		
		Ans: 1. Man and 2. Drosophila		
4	U	What is the chromosomal nature of a human diploid cell ?		
		Ans: 44 autosomes and 2 sex chromosomes		
5	U	What are homogenetic females ?		
		Ans: Females producing single type of gametes during gameto formation are called homogametic females.		
6	U	What are heterogametic males ?		
		Ans: Males producing two different types of gametes during gamete formation are called heterogametic males.		
7	U	Name the sex determining harmones in human beings.		
		Ans: Androgen in male and aestrogen in female.		

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	U	Explain sex determination by environment giving example.	Ans: Example: Bonellia viridis Size of the male and female norms - larvae free from other worms to develop into females - larva attaching to the protosis of the female develop into male.
2	U	Explain sex determination in man.	Ans: XX-XY method of sex determination - chromosomal pattern in male and female, i.e. XX in female and XY in male - homogamatic male - homogametic female - fertilisation of egg by X bearing sperm developes into female - egg fertilised by Y bearing sperms develops into male.
3	U	Explain 'genic balance theory' of sex determination in Drosophila.	Ans: This theory studied in Drosophila by Calvin B. Bridges in 1922 - ratio of X chromosomes to autosomes - strength of X chromosomes and autosomes - ratio of male and female relative strength.
4	U	Draw a diagramatic representation of sex determination in man.	Ans: 

TOPIC 26 : SEXLINKED INHERITANCE

CONTENT POINTS : Definition - Colour blindness - Pattern of inheritance - Haemophilia

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	Bleede's disease is alsa known as A. Haemorrhage B. Haemolytic disease C. Haemophilia D. Anaemia	C
2	U	Royal members of Europe, Hebrews and Russia commonly suffer from A. Haemophilia B. Hydrocephalus C. Haemolytic disease D. Colour blindness	A
3	U	T.H. conducted experiments and made observations on sex linked genes in Drosophilia. A. 1920 B. 1910 C. 1911 D. 1915	B
4	U	How many X linked genes are so far identified in man ? A. 170 B. 171 C. 175 D. 178	B

Q. No.	Obj.	Questions	Answers
5	U	Colour blindness is otherwise called as A. Bleeder's disease B. Deuteronopia C. Protonopia D. Achromatopsia	D
6	U	Colour blinsness was first discovered by A. Wilson B. John Cotto C. Bridges D. Baltzer	A
7	U	The inability to distinguish red colour is called as A. Colour blindness B. Deuteronopia C. Protonopia D. Achromatopsia	C
8	U	The inability to distinguish green colour is said to be A. Protonopia B. Deuteronopia C. Colour blindness D. Achromatopsia	B

Q. No.	Obj.	Questions	Answers
9	U	The sex chromosomes of normal maleness are A. XY B. XX C. XO D. YO	A
10	U	The sex chromosomes of normal female are A. XO B. XX C. XY D. YO	B
11	U	In a marriage between a normal man and a colour blind woman what will be the nature of F_1 sons and daughters. A. Normal daughters and normal sons B. Normal duaghters and colour blind sons C. Normal daughter (carriers) and colour blind sons D. Normal daughters (carriers) and normal sons	C
12	U	Which of the following cross directly produces in the F_1 normal daughters 25%, carrier daughters 25%, normal sons 25% and colour blind sons 25% ? A. XX x XY cc e- B. XX x XY ee c- C. XX x XY ce e- D. XX x XY ce c	D

Q. No.	Obj.	Questions	Answers
13	U	Which of the following crosses produces normal carrier daughters and normal sons ? A. XX x XY cc e- B. XX x XY ce c- C. XX x XY ee e-	A
		D. XX x XY cc c-	
14	U	Haemophilia was first reported by A. Wilson B. Baltzer C. Bridges D. John Cotto	D
15	U	When was haemophilia first reported by John Cotto ? A. 1820 B. 1811 C. 1803 D. 1800	C
FILL IN THE BLANKS			
1	K	Haemophilia is otherwise called as _____.	Bleeder's disease
2	K	Y linked genes are otherwise called as _____.	Holandric genes
3	K	The inability to distinguish certain colours is called_____.	Colour blindness

Q. No.	Obj.	Questions	Answers
4	U	_____ is the defect in the blood clotting mechanism.	Haemophilia
5	K	The progressive difficulty in walking is called_____.	Muscular dystrophy
6	K	The accumulation of water in the brain is called_____.	Hydro-cephalus
7	K	The inability of a person to distinguish red colour is called_____.	Protonopia
8	K	The inability of a person to distinguish green colour is called_____.	Deutero-nopia
MATCH THE FOLLOWING			
	U	A — B	
		1. T.H. Morgan — a. Green colour	1-e
		2. Wilson — b. Haemophilia	2-d
		3. John Cotto — c. Holandric genes	3-b
		4. Hydrocephalus — d. Colour blindness	4-f
		5. Muscular dystrophy — e. Drosophila	5-i
		6. Protonopia — f. Brain	6-j
		7. Dueteronopia — g. 2-8 minutes	7-a
		8. Y linked genes — h. X chromosome	8-c
		i. Difficult in walking	
		j. Red colour	
SHORT ANSWERS			
1	U	Define sex linked inheritance. Ans: 1. sex chromosomes having genes for body characters. 2. Mode of inheritance. Eg: Colour blindness	

Q. No.	Obj.	Questions	Answers
2	U	What are holandri genes ? Ans: Y linked genes	
3	U	What is the cause for colour blindness? Ans: 1. Altering of dominant C 2. Due to recessive mutation	
4	U	Define colour blindness. Ans: 1. Inability of distinguish red and green colour. 2. In dim light	
5	U	What is haemophilia ? Ans: 1. X linked gene 2. Absence of blood clotting	
6	U	What is criss-cross inheritance ? Ans: Inheritance of characters from male to male through a female vice versa.	
LONG ANSWERS			
1	U	Define colour blindness. How it is caused ? Mention the different types. Ans: 1. Inability to distinguish red colour from green 2. Dim light 3. Altering the dominant C in X chromosome. 4. Protonopia - red 5. Deuteronopia - green	

Q. No.	Obj.	Questions	Answers
2	U	Explain the inheritance of colour blindness in a marriage between a normal man and a colour blind woman. Ans: 1. F_1 normal carrier daughters and colour blind sons. 2. F_2 normal carrier grand daughters, colour blind grand daughters, normal grandson colour blind grandson. 3. Schematic diagram.	
3	U	Give an account of Haemophilia. Ans: 1. X linked genes 2. Bleeder's disease 3. Failure of clotting of blood 4. John Cotto - year 5. Criss-cross	

TOPIC 27 : MULTIPLE ALLELES

CONTENT POINTS : Definition - Blood group - Rh factor - Erythroblastosis foetalis

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	ABO blood groups were first discovered by A. William Harvey B. Landsteiner C. Weiner D. R.R. Race	B
2	K	ABO blood groups were first discovered in the year A. 1900 B. 1940 C. 1950 D. 1968	A
3	K	The polysaccharides synthesised on the surface of RBC are called as A. Antibody B. Agglutination C. Antigen D. Agglutinin	C
4	U	Antibodies are produced in A. RBC B. WBC C. Polysaccharides D. Blood serum	D

Q. No.	Obj.	Questions	Answers
5	U	Antigen A and B are absent in the blood group A. A B. AB C. O D. B	C
6	U	Antibodies are absent in the blood group A. A B. AB C. O D. B	B
7	K	Which one of the following blood groups is called universal donor ? A. O B. B C. AB D. A	A
8	K	Which one of the following blood groups is called universal recipient ? A. O B. AB C. B D. A	B

Q. No.	Obj.	Questions	Answers
9	U	Which of the following crosses produces offsprings with all the four types of blood group ? A. $I^AI^A \times I^BI^B$ B. $I^AI^O \times I^BI^B$ C. $I^AI^O \times I^BI^O$ D. $I^AI^B \times I^OI^O$	C
10	U	Rh factor was discovered by Landsteiner and Weiner in the year A. 1940 B. 1900 C. 1920 D. 1910	A
11	U	Which of the following crosses will result in erythroblastosis foetalis ? A. DD x dd B. DD x Dd C. Dd x dd D. DD x DD	C
FILL IN THE BLANKS			
1	K	The occurance of more than two alleles at the same loci in a chromosome is called_____.	multiple alleles
2	K	The polysaccharides are synthesised on the surface of_____.	RBC
3	K	The polysaccharides synthesised on the surface of RBC are known as_____.	antigen or agglutinogens
4	K	The clumping of blood cells is known as _____.	agglutination

Q. No.	Obj.	Questions	Answers
5	K	Rh factor was first discovered by _____ and_____.	Landsteiner Weiner
6	U	The three genes C, D, E responsible for Rh factor were discovered by_____ and_____.	R.R. Race A.R. Fisher
7	U	When the Rh antibodies present in the mother pass through the placent and attack the foetus_____ occurs.	Erythro-blastosis foetalis
8	K	Rh blood disease affecting the foetus is called_____.	haemolytic diseases

MATCH THE FOLLOWING

	A	B	
K	1. R.R. Race	a. O	1-d
U	2. Landsteiner	b. Erythroblastosis foetalis	2-f
U	3. Universal donor	c. Absence of antibodies	3-a
U	4. Haemolytic disease	d. Rh factor genes	4-b
K	5. AB	e. Presence of antibodies	5-
		f. ABO system	
		g. Absence of antigens	

SHORT ANSWERS

1	K	Define multiple alleles. Ans: More than two alleles at the same locus in a chromosome.
2	U	What is meant by codominance ? Ans: Both the dominant genes express their dominance. Eg. Blood group AB

Q. No.	Obj.	Questions	Answers
3	K	Define antibody.	
		Ans: 1. Produced in response to antigen 2. Blood serum	
4	U	What is antigen ?	
		Ans: Stimulates the production of specific antibody.	
5	K	Define Rh factor.	
		Ans: 1. Rhesus monkey (Macaca rhesus) 2. Landsteiner and Weiner	

LONG ANSWERS

1 U+S

Tabulate the relatioship between cellular antigens antibodies and genotypes of the four phenotypes of blood groups.

Ans:

	Pheno type	Anti gen	Anti body	Geno type	Can donate to	Can receive from
1.	A	A	Anti B	I^AI^A	A,AB	O,A
2.	B	B	Anti A	I^BI^B I^BI^O	B,AB	O,B
3.	AB	A,B	-	I^AI^B	AB	O,A,B, AB
4.	O	-	Anti A Anti B	I^OI^O	A,B,AB & O	O

2 U

What is codomminance ? How is ABO system of blood group inherited.

Ans: 1. Two dominant genes ocucrring in the same loci.
2. Both dominant loci genes express their dominance.
3. Isohaemagglutinins
4. Getting whether I^A, I^B or I^O

Q. No.	Obj.	Questions	Answers
3	U	What are the fields in which knowledge of blood groups applied ? Explain how. Ans: 1. Serological transfusion 2. Criminology 3. Medico-legal 4. How they are applied	
4	K	Describe erythroblastosis foetalis. Ans: 1. Rh factor 2. Rh^- mother x Rh^+ father 3. First foetus safe 4. Subsequent affected due to the antibodies produced by the mother.	

TOPIC 28 : MUTATION

CONTENT POINTS : Process of mutation - Gene mutation - Types - Mutagens

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	K	Name the scientist who used the term mutation first. A. Morgan B. Linnaeus C. Hugo de Vries D. Mendel	C
2	U	The basis for evolution is A. genotypic variation B. environmental variation C. phenotypic variation D. climatic variation	A
3	K	The scientific study of mutation in Drosophila was first conducted by A. Hugo de Vries B. T.H. Morgan C. Mendel D. Bridges	B
4	U	How many mutations in Drosophila were reported by T.H. Morgan and his co-workers ? A. 100 B. 110 C. 500 D. 550	C

Q. No.	Obj.	Questions	Answers
5	U	Gene mutation is caused due to a change in the A. DNA B. gene C. chromosome D. sinigle base pair of DNA	D
6	U	How many nucleotides serve as code for amino acids to form codon ? A. 11 B. 3 C. 5 D. 81	B
7	U	How many amino acids occur naturally in proteins ? A. 10 B. 21 C. 20 D. 28	C
8	U	One purine replacing another purine is called A. substitution B. addition C. transition D. transversion	C

Q. No.	Obj.	Questions	Answers
9	K	One purine replacing one pyrimidine is called A. transversion B. transition C. substitution D. addition	A
10	U	Which of the following gene mutations has genetic as well as evolutionary significance ? A. Addition B. Deletion C. Transition D. Substitution	D
11		X-rays were discovered by A. Ronald Roentgen B. Morgan C. Edge Alterberg D. Korana	A
12	K	Ronald Roentgen belongs to A. India B. England C. Germany D. USA	C
13	U	How much rise above the normal temperature cause mutations ? A. $10^{o}C$ B. $3-10^{o}C$ C. $7-17^{o}C$ D. $17-20^{o}C$	B

Q. No.	Obj.	Questions	Answers
14	K	The temperature that causes higher rate of mutation in Drosophila at A. 10°C B. 17°C C. 27°C D. 3-10°C	C
15	U	The chemical that causes mutation in Aspergillus is A. nitrous acid B. hydrogen peroxide C. phenol D. urethane	A
16	K	Aspergillus is a A. bacterium B. mold C. alga D. virus	B
17	U	The chemical that causes mutation in neurospora is A. nitrous acid B. urethane C. phenol D. hydrogen peroxide	D
18	U	The chemical that induce mutation in higher plants and Drosophila is A. urethane B. formaldehyde C. nitrous acid D. hydrogen peroxide	A

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	U	The plant in which Hugo de Vries observed mutation is_____	Oenothera lamarhiana
2	K	T.H. Morgan noticed the appearance of _____ mutant in Drosophila.	white eyed
3	U	The coded information in the_____ is duplicated and transmittd from parent to offspring.	DNA
4	K	Gene mutation is otherwise called as _____.	Point mutation
5	K	The mutation that occur in the base pair of DNA is called_____.	Point mutation or Gene mutation
6	K	When one or more bases are lost from a DNA molecule it is called as_____.	Deletion
7	U	Somatic and genetic damages done by radiation rae due to_____ in the living cells.	ionization
8	U	Highly reactive chemicals that react with genes, chromosomes and other cell parts are produced by the_____ which combine with oxygen.	free ions
9	U	Edge Altenberg exposed_____ to UV rays and obtained a number of mutant varieties.	Drosophila
10	K	Significant results have come when _____ of maize were exposed to UV rays.	pollengrains
11	U	The production of mutations by chemical substances was first reported by _____ and_____.	Thom and Stinberg
12	U	Formaldehyde has a mutagenic effect on _____ during spermatogenesis.	Drosophila

Q. No.	Obj.	Questions		Answers
MATCH THE		FOLLOWING		
		A	B	
	U	1. Roentgen	a. Nitrous acid	1-f
	U	2. Edge Altenberg	b. Chemical agents	2-d
	U	3. Thom and Stinberg	c. Hydrogen peroxide	3-b
	U	4. Aspergillus	d. UV rays	4-a
	U	5. Neurospora	e. Formaldehyde	5-c
			f. X rays	
			g. Mutation	
SHORT ANSWERS				
1	K	Define mutation. What are the causes for heritable variations ?		
		Ans: 1. Sudden heritable change		
		2. Hungo de Vries		
2	U	What are the causes for heritable variations ?		
		Ans: 1. recombination		
		2. crossing over		
		3. mutation		
3	U	What are mutogenic agents ? Mention their types.		
		Ans: 1. Factors causing mutation		
		2. Radiation UV rays, heat chemicals		
4	K	Define induced mutation.		
		Ans: Factors that induce mutation		
		Eg: EMS (Ethyl methane sulphonate)		

Q. No.	Obj.	Questions Answers
5	K	Mention the two types of high energy radiation. Ans: 1. Electromagnetic 2. Particulate
6	U	What are electromagnetic and particulate radiations ? Ans: 1. Short waves sub-atomic particles Eg. Alpha
LONG ANSWERS		
1	U	Explain the gene mutation. Ans: 1. DNA molecule 2. Nucleotide 3. Codon 4. Amino acids 5. Point mutation
2	U	What are the types of mutations that occur at genic level ? Ans: 1. Substitution Transition — Transversion 2. Addition 3. Deletion
3	K	Give an account of high energy radiations. Ans: 1. X-rays - Roentgen 2. Electromagnetic short waves 3. Particulate alpha, beta, gamma 4. Ionisation of living cells

Q. No.	Obj.	Questions Answers
4	K	Give an account of chemical mutagens. Ans: 1. Thom and Stinberg 2. Nitrous acid - Aspergillus 3. Hydrogen peroxide - Neurospora 4. Urethane and phenol - Drosophila 5. Formaldehyde - Drosophila - Spermatogenesis

TOPIC 29 : PLOIDY

CONTENT POINTS : Definitions - Types - Hypo and hyper ploidy - Effects of ploidy in mn - Significance of ploidy

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	Which are found in pairs during cell division ? A. Genes B. Chromatids C. Chromosomes D. DNA	C
2	K	The total number of chromosomes present in normal man. A. 46 B. 44 C. 8 D. 23	A
3	K	The total number of chromosomes present in normal Drosophila. A. 6 B. 8 C. 46 D. 110	B
4	U	The chromosomal condition of gamete is A. diploid B. triploid C. polyploid D. haploid	D

Q. No.	Obj.	Questions	Answers
5	U	Variations that involve entire sets of chromosomes is called A. Aneuploidy B. Monoploidy C. Euploidy D. Diploidy	C
6	U	Variations that involve only a single chromosome within a set is called A. Aneuploidy B. Monoploidy C. Trisomy D. Monosomy	A
7	U	Monoploidy is seen in A. honey bees B. female honey bees C. workers D. male honey bees	D
8	U	The number of chromosome sets in the somatic cells of most of the plants and animals is A. haploid B. diploid C. polyploid D. aneuploid	D

Q. No.	Obj.	Questions	Answers
9	U	Which of the following shows haploid number of chromosomes ? A. Sperm B. Ovum C. Gamete D. Somatic cell	C
10	U	Bridges noticed XO male Drosophila in the year A. 1910 B. 1903 C. 1916 D. 1920	C
11	U	Monosomic condition is recognised by A. 2n+1 B. 2n-1 C. 2n+2 D. 2n-2	B
12	U	Trisomic condition is recognised by A. 2n+1 B. 2n+2 C. 2n-1 D. 2n-2	A
13	U	When a diploid set of chromosomes lack of pair of chromosome it is called as A. Monosomy B. Trisomy C. Tetrasomy D. Nullisomy	D

Q. No.	Obj.	Questions	Answers
14	U	When a diploid set of chromosomes has extra pair of chromosomes it is called A. Tetrasomy B. Monosomy C. Nullisomy D. Trisomy	A
15	U	A triploiid defective male child has the chromosome number A. 66 B. 69 C. 47 D. 45	B
16	U	An extra copy of 21st chromosome in man causes A. Turner's syndrome B. Klinefelter's syndrome C. Down's syndrome D. Aneuploidy	C
17	U	Which of the following syndromes leads to death before one year of age ? A. Down's syndrome B. Turner's syndrome C. 18 Trisomy D. Klinefelter's syndrome	C

Q. No.	Obj.	Questions	Answers
18	U	The chromosomal condition in persons suffering from Klinefelter's syndrome. A. 44+xxy B. 44+xx C. 44+xy D. 44+xo	A
19	U	The chromosomal condition in persons suffering from Turner's syndrome A. 44+x B. 44+xxy C. 44+xy D. 44+xx	A
20	U	In which of the following syndromes the total number chromosomes varies from others A. 18 trisomy B. Klinefelter C. 21 trisomy D. Turner's syndrome	D
21	A	Tetraploid corn contains more vitamin. A. Vitamin A B. Vitamin B C. Vitamin C D. Vitamin D	A
FILL IN THE BLANKS			
1	K	The number of chromosomes of the organisms is reduced to half in the gonads by_____.	meiosis

Q. No.	Obj.	Questions	Answers
2	K	Polyploidy is commonly noticed in _____.	plants
3	K	Bridges in 1916 observed male Drosophila with the sex chromosome _____.	xo
4	K	Bridges in 1916 observed female Drosophila with the sex chromosome _____.	xxy
5	K	Congenital diseases are called_____.	Syndromes
6	K	Down's syndrome was formerly called as _____.	Mongolism
7	K	Ploidy is economically useful in _____.	Horticulture
8	K	_____ results in the production of large sized plants, flowers and fruits.	Ploidy
9	U	Tetraploid cabbage and tomatoes contan more_____.	Ascorbic acid

MATCH THE FOLLOWING

	A	B	
K	1. Klinefelter	a. 2n-1	1-d
K	2. 21 Trisomy	b. helix of the ear poorly developed	2-e
U	3. Monosomy	c. 2n-2	3-a
U	4. Tetrasomy	d. Sterile male	4-f
U	5. Triploidy	e. Mongoloid idiol	5-g
		f. 2n+2	
		g. 2n+n	

SHORT ANSWERS

1	U	What is ploidy ? Ans: Change in the number of chromosomes - in a single set or in sets.

Q. No.	Obj.	Questions Answers
2	U	What is genome ? Ans: Haploid set of chromosomes in a species.
3	K	Define euploidy. Ans: Changes in sets of chromosomes. Eg: diploid, triploid, monoploid
4	K	Define aneuploidy. Ans: Change in the number of chromosomes within a set. Eg: hyperploidy hypoploidy
5	U	Write a short note on hyperploidy. Ans: Addition of 1 or more chromosomes to a diploid set. Eg: trisomy 2n+1 tetrasomy 2n+2
6	U	Write a short note on hypoploidy. Ans: Loss of 1 or 2 chromosomes in a diploid set. Eg: monosomy 2n-1 nullisomy 2n-2
7	K	List out the symptoms of Down's syndrome. Ans: 1. Mentally retarded 2. Flattened face with fissures 3. Flattened nose 4. Ears malformed 5. Increased space between the eyes
8	K	List the symptoms of 18 trisomy. Ans: 1. Head laterally flattened 2. Helic of ear poorly developed 3. Hands short 4. Digital imprints simple

Q. No.	Obj.	Questions Answers
9	U	Why are polyploid plants sterile ? Ans: Physiological processes controlled by genes are disturbed.
10	U	Which leads 18 trisomy ? Point out its symptoms. Ans: 1. Addition of one chromosome to 18th pair. 2. Symptoms: a. Laterally flattened head b. Helix of the ear poorly developed c. Hands are short d. Digital imprints are simple e. Mentally retarded
11	U	What is meant by sex chromosomal aneuplody ? Give an account of aneuploidy in man. Ans: 1. Change in the sex chromosomes 2. Due to meiotic non-disjunction 3. Types -- Klinefelter -- Turner 4. Symptoms
12	U	Bring out the effect and symptoms of ploidy. Ans: 1. Production of large sized plants, flowers and fruits (Horticulture). 2. Physiological effects (eg) more Vitamin A in tomato. 3. Sterility in F_1 generation 4. New species formation is rare. 5. In man congenital diseases. 6. Production of seedless fruits.

Q. No.	Obj.	Questions · Answers
LONG ANSWERS		
1	U	What is euploidy ? Describe its types with example. Ans: 1. Change in sets of chromosomes. 2. Monoploidy (n) Eg: Male honey bee 3. Diploidy (2n) Eg: Man 4. Polyploidy (2n+n) Eg: 1. In plants more 2. In animals rare
2	U	What is aneuploidy ? Who studied about it in detail ? Explain its types. Ans: 1. Change in the number of chromosomes in a diploid set. 2. Bridges in Drosophila has studied 3. Hyperploidy Trisomy 2n+1 — Tetrasomy 2n+2 4. Hypoploidy Monosomy 2n-1 — Nullisomy 2n-2
3	A	How is Down's syndrome caused ? What are its symptoms? Ans: 1. 21 trisomy (2n+1) is known as Dow's syndrome or 2. Mongolism 3. Symptoms of Mongolism are as follows a. Mentally retarded condition, b. Flattened face, nose, c. Ear malformed, d. Mouth opened, e. Heart, hands, feet defective.

UNIT VI : ENVIRONMENT IN RELATION TO HUMAN WELFARE

TOPIC 30 : COMMUNICABLE DISEASES-I

CONTENT POINTS : Agent factors - Chain of infection - Source - Mode of transmission - Susceptible host - Control

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	Which of the following is a biological agent for disease ? A. Protein B. Sound C. Virus D. Pollutants	C
2	U	Which of the following is a physical agent for disease ? A. Radiation B. Carbohydrate C. Virus D. Tearing	A
3	U	Which of the following diseases is not connected with dog ? A. Plague B. Rabies C. Leishmaniasis D. Hydatid	A
4	U	Which of the following zoonotic diseases is caused by virrus ? A. Plague B. Hydatid C. Leishmaniasis D. Rabies	D

Q. No.	Obj.	Questions	Answers
5	U	Common cota, diptheria and whooping cough transmitted through A. contact with sod B. droplet infection C. bite of an animal D. vectors	B
FILL IN THE BLANKS			
1	U	The diseases and infections which are transmitted from vertebrrate animals to man are called_____.	Zoonoses
2	U	The chemical sulfonamide is used to cure_____.	Plague
3	U	Tetracycline is used to cure_____.	Cholera
SHORT ANSWERS			
1	U	What is meant by incubation period ? Ans: The time interval between the entry of pathogen and onset of first symptom.	
2	K	List the social agents causing disease. Ans: Poverty, smoking, drugs, alcohols.	
3	U	Mention the three links in the chain of infection. Ans: 1. Reservoir 2. Transmission 3. Susceptible host	
4	U	List the three types of reservoirs with example. Ans: 1. Human reservoir - man 2. Animal reservoir - dog 3. Non-living things - soil	

Q. No.	Obj.	Questions Answers
5	U	Point out the two different types of vectors. Ans: 1. Mechanical 2. Biological
6	U	What is meant by chaemoprophylaxis ? Ans: Management of disease through chemicals.
LONG ANSWERS		
1	U	List out any five of the agent factors with examples that are concerned with communicable diseases. Ans: 1. Biological - virus, bacteria, fungi, protozoans 2. Nutrient - protein, fat, carbohydrate 3. Physical - heat, cold, humidity, pressure, radiation, electricity 4. Chemical - urea, uric acid 5. Mechanical - crushing, tearing, dislocations 6. Social - poverty, smoke, drugs, alcohols 7. Factors necessary for health - hormones, enzymes, genetic disorders
2	U	Give an account of three types of reservoirs in communicable diseases. Ans: 1. Human reservoir - commonest source 2. Animal reservoir a. Protozoans - Rat b. Virus - Rabies, dogs c. Protozoans - Dog d. Helminthas - Hydatid 3. Non-living reservoir - soil, water and air

Q. No.	Obj.	Questions Answers
3	U	Explain the mode of transmission of communicable diseases. Ans: I. Direct transmission: a. Direct contact - Eg. AIDS b. Droplet infection - Eg. Common cold c. Contact with soil - Eg. Tetanus d. Bite of animals - Rabies e. Transplancental transmission - AIDS II. Indirect transmission a. Veichle borne - Cholera b. Vector borne - Plague c. Air borne - Tuberculosis d. Fomite borne - Typhoid e. Uncleaned hands and fingers - Dysentry
4	U	Describe disease prevention and control measure. Ans: 1. Controlling the reservoir 2. Breaking the rules of transfer 3. The susceptible host: a. active immunisation b. passive immunisation c. chemopropylaxis d. non-specific measures

TOPIC 31 : COMMUNICABLE DISEASES-II

CONTENT POINTS : Airborne diseases - Common cold, Measles - Rubeola, Whooping cough - Influena Verticella Zoster - Mumps Diphtheria - Tuberculosis

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	The disease caused by more than 100 different viruses is A. Measles B. Common cold C. Influenza D. Mumps	B
2	U	Measles is caused by the virus A. Mortilli virus B. Bordetella pertusis C. Micobacterium D. Rota virus	A
3	U	The vaccine given to prevent Rubeola is A. DPT B. Dt C. MMR D. BCG	C
4	U	The vaccine given to control pertusis A. DT B. BCG C. MMR D. DPT	D

Q. No.	Obj.	Questions	Answers
5	U	Mumps is an acute infectitious disease caused by A. Paramixo virus B. Rota virus C. Rabdo virus D. Polio virus	A
FILL IN THE BLANKS			
1	K	Measles is otherwise called as_____.	Rubeola
2	K	Whooping cough is otherwise called as _____.	Pertusis
3	K	Bordetella pertusis causes the disease _____.	Whooping cough (Pertusis)
4	K	Influenzsa is cured by_____.	Amantidine
5	U	Chicken pox is otherwise called as _____.	Varicella zoster
6	U	Mumps is an acute infectitious disease caused by_____.	Paramyxo virus Paotidis
7	K	Diphtheria is caused by_____.	Corny bacterium diphtheriae
8	U	Tuberculosis is caused by_____.	Mycobacterium tuberculosis
9	U	Mycobacterium tuberculosis was discovered by_____.	Robert Cock

Q. No.	Obj.	Questions		Answers
MATCH THE FOLLOWING				
		A	B	
	K	1. Rhiphampicin	a. Bordetella	1-d
	K	2. Amantidine	b. Mortillii virus	2-e
	K	3. Whooping cough	c. Rota virus	3-a
	K	4. Diphtheria	d. TB	4-f
	K	5. Measles	e. Influenza	5-b
			f. Corny bacterium	
			g. Sulphonamide	
SHORT ANSWERS				
1	K	What is meant by droplet infection ? Ans: The direct projection of droplet spray of saliva and nasopharyngeal secretions into conjunctiva.		
2	K	What is droplet nucleus ? Ans: The droplets dry and the remaining is the droplet nucleus		
3	K	List the symptoms of tuberculosis. Ans: 1. Cough - more than one month 2. Chest pain 3. Fever in the evenings 4. Blood spilling 5. Loss of weight 6. Loss of appetite		
4	K	List the antibiotics used to cure TB. Ans: 1. Raiphampicin 2. Pyrajinamide 3. Streptomycin		

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	K	List the name of the disease, causative agent, symptoms, control and prevention of any fiiive airborne diseases. Ans: 1. Common cold 2. Measles 3. Whooping cough 4. Influenza 5. Chickenpox 6. Mumps 7. Diphtheria 8. Tuberculosis	

TOPIC 32 : WATER AND FOOD BORNE DISEASES

CONTENT POINTS : Cholera, Dysentry, Typhoid, Polio myelitis, Acute diarrhoea, Jaundice

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	Which of the following disease is epidemic and endemic ? A. Rabies B. Mumps C. Cholera D. Polio	C
2	U	Cholera disease is caused by A. Vibrio Cholerae B. E. coli C. Mycobacterium D. Paramyxo virus	A
3	U	Dysentry is caused by A. Salmonella B. Entamoeba histolytica C. Mortilli D. Mycobacterium	B
4	K	Typhoid fever is caused by A. Cornyne bacterium B. Entamoeba C. Shigellae D. Salmonella	D

Q. No.	Obj.	Questions	Answers
5	U	Which of the following disease is caused by virus ? A. Typhoid B. Cholera C. Polio D. Dysentry	C
6	K	Acute diarrhoeal disease is caused by the protozoan A. E. coli B. Salmonella C. Entamoeba D. Rota virus	C
7	U	The disease caused by viruses, bacteria, prortozoans and intestinal worms. A. Acute diarrohea B. Dysentry C. Typhoid D. Cholera	A
8	K	The type of jaundice severe and leads to high fatality rate. A. Hepatitis A virus B. Hepatitis B virus C. Non-hepatitis A virus D. Non-hepatitis B virus	B

Q. No.	Obj.	Questions	Answers
9	A	In which the fatality rate is low in jaundice. A. Hepatitis A virus B. Hepatitis B virus C. Non-hepatitis A virus D. Non-hepatitis B virus	A
10	U	Which of the following organs is affected by jaundice ? A. Liver B. Heart C. Kidney D. Brain	A
FILL IN THE BLANKS			
1	K	Cholera is an acute diarrhoeal disease caused by_____.	Vibrio cholerae
2	K	Amoebic dysentry is otherwards called as_____.	Amoebiasis
3	K	The term enteric fever includes both typhoid and_____ fevers.	Paratyphoid
4	K	Polio myelitis is caused by_____.	Polio virus
5	U	Acute diarrhoeal disease is caused by the virus_____.	Rota virus
6	U	Tarnia rolium is otherwise called as _____.	Tapeworm
7	K	Whip worm is otherwise known as_____.	Trichuris trichura
8	K	Jaundice affects the organ_____.	liver

Q. No.	Obj.	Questions		Answers
MATCH THE FOLLOWING				
		A	B	
	K	1. Cholera	a. Hepatitis virus	1-d
	K	2. Typhoid	b. Entamoeba	2-c
	K	3. Viral diarrhoea	c. Salmonella	3-e
	K	4. Dysentry	d. Vibrio	4-b
	K	5. Jaundice	e. Rota virus	5-a
SHORT ANSWERS				
1	U	Point out the symptoms of Cholera. Ans: 1. Watery diarrhoea 2. Vomiting 3. Rapid dehydration 4. Musceles cramps.		
2	U	Point out the control and preventive measures of typhoid fever. Ans: 1. Control of reservoir 2. Control of sanitation 3. Immunisation		
3	U	Point out the two types of Polio myelitis. Ans: 1. Non-paralytic Polio 2. Paralytic Polio		
4	K	What are the control and preventive measures of Polio? Ans: 1. Proper sanitation and pure water 2. Immunisation: (a) IPV (b) OPV		

Q. No.	Obj.	Questions	Answers
5	U	Point out the intestinal worms that cause acute diarrhoea.	
		Ans: 1. Taenia solium	
		2. Trichuris trichura	
6	U	List out the symptoms of jaundice.	
		Ans: Fever, chills, headache, fatigue, general weakness, vomiting, nausea and dark yellow urine.	
LONG ANSWERS			
1	U	List the causative agent, incubation period, mode of transmission and control and preventive measures of Cholera and dysentry.	
		Ans: <u>Cholera</u>	
		1. Vibrio Cholerae	
		2. Incubation period 1-2 days	
		3. Symptoms: Profuse effortless water diarhoea, vomiting, dehydration, suppression of urine, muscle cramps.	
		4. Transmission: Faecally contaminated water, food, direct contact, vectors. Control: Control fluid loss, vaccines.	
		<u>Dysentry</u>	
		1. Entamoeba histolytica and bacterium	
		2. Incubation 2-4 weeks	
		3. Symptom: Abdominal discomfort, diarrhoea with blood, fever and chillness	
		4. Transmission: Contaminated food and water	
		5. Control and preventive measures - washing hands before eating, food covered, sanitation of toilets.	

Q. No.	Obj.	Questions	Answers
2	U	List the cause, incubation period, transmission and control and prevention of typhoid and poliomyelitis.	
		Ans: <u>Typhoid</u>	
		1. Cause: Salmonella typhi	
		2. Incubation: 10-14 days	
		3. Transmission: faecal - oral, urine - oral, directly through soiled hands.	
		4. Control: Reservoirs -- trnasferred to hospitals to prevent spreading sanitation and immunisation.	
		<u>Poliomyelitis</u>	
		1. Cause - Polio virus	
		2. Incubation - 7-14 days	
		3. Symptoms:	
		a. Non-paralytic Polio: Stiffness and pain in the neck and back	
		b. Paralytic: Attacks central nervous system, fever	
		c. Transmission: Faecal oral, droplet infection	
		d. Control and preventive measures	
		No proper cure, care will minimise crippling, hygiene and sanitation immunisation.	

TOPIC 33 : CONTACT DISEASES

CONTENT POINTS : Scabios, Leprosy Sex transmitted diseases - Gouorrhoea, Syphilis, AIDS

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	U	Which one of the following is a contact disease ? A. Hypertension B. Cancer C. Leprosy D. Diabetes	C
2	K	Leprosy is caused by A. Cornybacterium B. Mycobacterium C. E. coli D. Salmonella	B
3	K	Kaposi sarcoma is a symptom of A. Cancer B. HIV C. AIDS D. Leprosy	C
4	K	Enlargement of lymph glands in AIDS is called A. Herpes B. Candidiasis C. Kaposi sarcoma D. Lymph adenopathy	D

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	U	Scabies is caused by_____.	Itchmite
2	U	Leprosy is otherwise called as_____.	Hanson's disease (social disease)
3	U	Leprosy is cured by_____.	Rhimphampicin
4	K	The antibiotic used to cure gonorrhoea _____.	Penicilline
5	A	HIV was first isolated and identified by_____ in USA.	Robert Gallo
6	A	Recently subtype of HIV,_____ has been isolated.	HIV IC
7	A	HIV invades into the_____ cells of the WBC.	T helper cells
SHORT ANSWERS			
1	U	List the symptoms of scabies. Ans: 1. Itching in between fingers. 2. Elbow folds 3. Arm pits 4. Fever	
2	U	List the mode of transmission of leprosy. Ans: 1. Droplet infection 2. Contact 3. Breast milk	
3	U	Name the sexually transmitted disease. Ans: 1. Syphilis 2. Gonorrhoea 3. AIDS	

Q. No.	Obj.	Questions Answers
4	U	What are symptoms of gonorrhoea ? Ans: 1. Burning sensation 2. Pus while pausing urine
5	U	What are the symptoms of syphilis ? Ans: 1. Painless ulcer in the genitalia 2. Rashes on the body
6	U	Give the expansion of AIDS ? Ans: Acquired Immuno Deficiency Syndrome
7	A	Give the expansion of HIV ? Ans: Human Immuno Virus
8	U	Mention the two test used to diagnose AIDS. Ans: 1. Eliza test 2. Wester Blot test
9	K	What is Western Blot test ? Ans: Confirmative test for HIV positive
LONG ANSWERS		
1	U	List the symptoms and controlling measures of leprosy. Ans: <u>Symptoms</u> 1. Pigmented patches 2. Loss of cutaneous sensation 3. Thicked nerves <u>Control</u> 1. Antibiotic Riphampicin 2. Prevent transmission 3. NLEP

Q. No.	Obj.	Questions Answers
2	U	List the minor and major symptoms of AIDS Ans: <u>Minor</u> 1. Persistant cough 2. Skin disease 3. Viral infection 4. Candidiasis 5. Lymphadenopathy 6. Tuberculosis 7. Nerve damage 8. Koposi sarcoma 9. Loss of memory <u>Major</u> 1. Loss of weight 10% 2. Chronic diarrhoea 3. Prolonged fever 4. Night sweat
3	U	Explain the mode of transmission of HIV. Ans: 1. Sexual 2. Blood transfusion 3. Surgical equipments 4. Maternal foetal transfusion 5. Drug addiction
4	U	List the preventive measures to control AIDS. Ans: 1. Prevention of blood transfusion without checking 2. Using sterilised syringes 3. Primary health care 4. Counselling

TOPIC 34 : VECTORBORNE DISEASES

CONTENT POINTS : Zoonoses - Malaria - Filaria - Japanese Encephalitis, Plague, Rhabies - Tetanus

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	Which of the following is a protozoan zoonoses ? A. Plague B. Trypanozomiasis C. Taeniasis D. Rabies	B
2	K	The vector that transmits plasmodium A. Mosquito B. Culex C. Culicine D. Female Anaphelis	D
3	K	Wucheria broncraft causes the disease A. Filaria B. Malaria C. Japanese encephalitis D. Plague	A
4	K	Japanese Encephalitis is caused by the virus A. Rota virus B. B Arbovins C. Paramyxo virus D. Mortilli virus	B

Q. No.	Obj.	Questions	Answers
5	U	The vector that transmits the Japanese Encephalitis A. Culicine mosquitoes B. Anaphelus C. Culex D. Mosquitoes	A
6	U	The antibiotic tetracycline is used to cure A. Japanese Encephalitis B. Filaria C. Plague D. Malaria	C
7	U	Japanese Encephalitis affects the following organ A. liver B. brain C. pancreas D. lungs	B
FILL IN THE BLANKS			
1	K	Taeniasis is a zoonotic disease of _____.	helminthic
2	K	Malaria is caused by_____.	Plasmodium
3	K	_____ is used to kill the larvae of Culex mosquito.	Hetrazan
4	K	Plague is caused by_____.	Yersinia pestis
5	U	The commonest and most efficient vector of Plague is_____.	Xenopsylla

Q. No.	Obj.	Questions	Answers
6	U	Rabis is caused by the virus family _____.	Rabdoviridae
7	U	Tetanus is caused by_____.	Clostridium tetani

MATCH THE FOLLOWING

		A	B	
	K	1. Bacterial zoonoses	a. Trypanosomiasis	1-d
	K	2. Fungal zoonoses	b. Rabies	2-e
	K	3. Protozoan zoonoses	c. Taeniasis	3-a
	K	4. Viral zoonoses	d. Plague	4-b
	K	5. Helminthic zoonoses	e. Mycotic disease	5-c
			f. Ticks and mites	

SHORT ANSWERS

1	U	List the drugs used to cure Malaria.
		Ans: a. Chloroquine
		b. Primaquine
2	U	List the symptoms of filaria.
		Ans: 1. Fever, acute inflammation of lymphglands. Obstruction of lymphatic vessels.
		2. Hydrocoel
		3. Elephantiasis
3	K	What is chemotherapy ?
		Ans: Effective killing of disease causing germs by chemical substances, curing the patient.

Q. No.	Obj.	Questions	Answers
LONG ANSWERS			
1	K	List the causative agents, symptoms, controls and preventive measures of any five vector borne diseases. Ans: 1. Malaria 2. Filaria 3. Japanese Encephalitis 4. Plague 5. Rabies 6. Tetanus	

TOPIC 35 : NON-COMMUNICABLE DISEASES

CONTENT POINTS: Metabolic disorders in man - obesity, diabetes, stroke, coronary heart diseases, cancer, hypertension, rheumatic heart disease.

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The abnormal growth of the adipose tissue is defined as A. Cancer B. Obesity C. Stoke D. Hypertensopin	B
2	K	Which of the following is the carbohydrate metabolic disorder ? A. Obesity B. Diabetes C. Stroke D. Cancer	B
3	K	In diabetic patients the blood glucose level is more than A. 120 mg B. 140 mg C. 160 mg D. 180 mg	A
FILL	IN THE BLANKS		
1	K	Carbohydrate metabolic disorder results in_____.	Diabetes mellitus
2	U	The disease where there is chronic secretion of large volume of urine containing glucose is_____.	Diabetes mellitus

Q. No.	Obj.	Questions	Answers
3	U	The defective production of insulin causes_____.	Diabetes mellitus
4	U	_____ is a cerebrovascular disease.	Stroke
5	U	Shortness of breath in heart disease is called_____.	Dyspnoea

MATCH THE FOLLOWING

	A	B	
K	1. Polyphagia	a. Obesity	1-e
K	2. Dyspnoea	b. Hypertension	2-c
K	3. Cardiovascular disease	c. Coronary heart disease	3-d
K	4. Saturated fat	d. Stroke	4-a
K	5. Gall bladder disease	e. Diabetes mellitus	5-b

SHORT ANSWERS

1	U	What is called metabolic disorder ? Ans: Metabolic blocks in a biosynthetic pathway resulting in defecting phanotype called metabolic disorders.
2	U	What is metabolic block ? Ans: Mutation in any gene affecting the production of normal enzyme or producing defective enzyme causes blocks in biosynthetic pathway called metabolic blocks.
3	U	What are the factors causing obesity ? Ans: Genetic factors, physical inactivity, eating factors and endocrine factors.
4	U	What is the positive risk factor of obesity ? Ans: In the development of hypertension, diabetes, gall bladder disease, coronary heart disease and arthritis.

Q. No.	Obj.	Questions Answers
5	K	How do you control obesity ? Ans: The control of obesity centres round weight reduction. This can be achieved by dietary changes and increased physical activity.
6	K	What are the factors the defective production or action of insulin ? Ans: 1. Pancreatic disorders 2. Defects in the synthesis of insulon from beta cells 3. Destruction of beta cells 4. Genetic defects
7	K	Define polyphagia. Ans: Excessive appetite leading increased intake of food.
8	K	Define polyurea. Ans: Excretion of increased quantity of urine.
9	K	Define polydipsia. Ans: Excessive thirst leading to increased consumption of water.
10	U	What are the symptoms of coronary heart disease. Ans: Dyspnoea Dizziness Swelling of legs and ankles Pain in the chest
11	U	What are the risk factors of coronary heart disease ? Ans: Smoking, hypertension, raised serum cholesterol, diabetes, genetic factors, physical inactivity, harmones, alcohol, continuing stress condition, etc.

Q. No.	Obj.	Questions · Answers
12	K	Define hypertension. Ans: Systolic pressure equal to or greater than 16 mmHg or the diastole pressure equal to or greater than 95 mmHg.
LONG ANSWERS		
1	K	What are the symptoms of diabetes mellitus ? Ans: 1. Blood sugar level more than 120 mg. 2. Symptoms of polyurea, polydipsia and polyphagia. 3. Weakness and body pain.
2	U	What are the primary preventive measures of diabetes mellitus ? Ans: 1. Maintaining norrrmal body weight. 2. Correcting over nutrition and obesity. 3. Avoid smoking and alcohol. 4. Controlling B.P. 5. Avoiding risk factors.
3	U	Explain symptoms of stroke. Ans: 1. Cerebra vascular disease causing both physical and mental crippling. 2. Caused by abnormalities such as stenosis occlusion and rupture of the arteries. 3. Risk factors 4. Control and preventive measures.
4	U	Write notes on coronary heart disease. Ans: 1. Definition for coronary heart disease. 2. Risk factors 3. Symptoms 4. Control and preventing measures

Q. No.	Obj.	Questions Answers
5	K	Write notes on cancer. Ans. 1. Characteristics 2. Risk factors and causes 3. Control and preventive measures
6	K	Write notes on hypertension. Ans: 1. Definition 2. Risk factors 3. Non-modifiable risk factors 4. Modifiable risk factors 5. Prevention
7	U	Tabulate the differences between communicable and non-communicable diseases. Ans: Refer p. 391, Biology Text, Tamil Nadu

TOPIC 36 : HUMAN HEALTH AND DISEASES

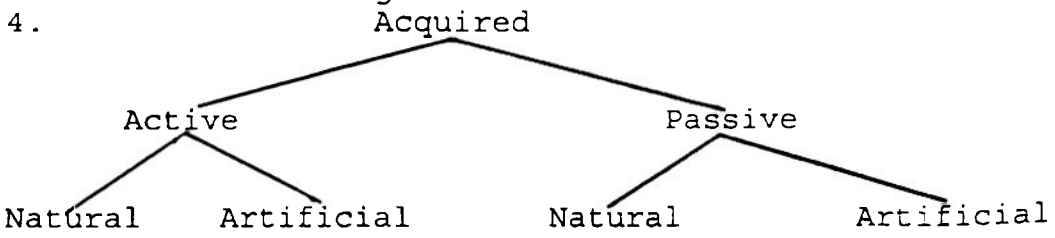
CONTENT POINTS : Determinents of health dimensions - Immunity

Q. No.	Obj.	Questions	Answers
MULTIPLE CHOICE QUESTIONS			
1	U	World Health Organisation was started in the year A. 1940 B. 1948 C. 1958 D. 1950	B
2	U	Which of the following gives natural immunity ? A. Vaccine B. Immunisation C. Sweat glands D. Mammary glands	C
3	U	The resistance developed by an individual as a result of antigenic stimulus in the body is A. artificial active acquired B. passive acquired C. natural passive acquired D. active acquired immunity	D
4	U	The immunity transferred passively from mother to child through placenta is called A. natural passive acquired immunity B. active acquired immunity C. artificial active acquired immunity D. passive acquired immunity	A

Q. No.	Obj.	Questions	Answers
5	U	Which of the following is a live vaccine ? A. BCG B. TT C. MMR D. DPT	A
6	U	Cholera vaccine is a A. live vaccine B. killed vaccine C. antiserum D. serum	B
7	A	The vaccine given to the baby in the sixth week. A. Typhoid B. BCG C. O Polio D. DPT of polio	D
8	A	The MMR vaccine is given at the age of A. 9-12 months B. 15th month-2 years C. 6 years once D. after 1 year	B
9	A	The second booster for DT and Polio is given at the age of A. 9-12 months B. 10th year C. 4-6 years D. 16th year	C

Q. No.	Obj.	Questions	Answers
FILL IN THE BLANKS			
1	K	The term disease literally means _____.	without ease
2	K	The natural immunity is otherwise known as_____.	innate immunity
3	K	The resistance exhibited by the host towards the pathogens is called _____.	immunity
4	K	The resistance against infectitious disease that an individual acquires during life time is known as_____.	acquired immunity
5	U	The vaccine given to new born baby is _____.	BCG
6	U	The vaccine given to the infant within 15 days is_____.	O Polio
7	U	Measles vaccine is given at the age of _____.	9-12 months
SHORT ANSWERS			
1	U	Define health. Ans: Physical, mental and social well being.	
2	U	List the determinants of health. Ans: 1. Heredity 2. Environment 3. Life style 4. Socio-economic condition 5. Health and family welfare services	
3	K	Point out the dimensions of health. Ans: Physical, mental, social	
4	K	List the signs of good physical health. Ans: 1. Good complexion 2. Clear skin 3. Bright eyes 4. Lustrous hair 5. Good appetite 6. Sound sleep	

Q. No.	Obj.	Questions · Answers
5	K	What are the two phases of disease ? Ans: 1. Prepathogenesis 2. Pathogenesis
6	K	Define prepathogenesis. Ans: Period prior to the onset of disease.
7	K	Define pathogenesis. Ans: 1. Entry of the disease agent 2. Infectitious disease
8	K	What is meant by immunity ? Ans: Resistance exhibited by the host.
9	K	What are the two major types of immunity ? Ans: 1. Natural immunity 2. Acquired immunity
10	K	Define immunisation. Ans: 1. Inoculation of vaccines 2. Prevent diseases
11	U	Classify immunising agents. Ans: 1. Vaccines 2. Immunoglobins 3. Antisera
LONG ANSWERS		
1	U	List the characteristics of a mentally healthy person. Ans: 1. Free from internal conflicts 2. Well adjusted 3. Neither under-estimates nor over estimates 4. Knowing one's own self 5. Good self control

Q. No.	Obj.	Questions	Answers
2	K	Define immunity. What are its types ? Explain them.	
		Ans: 1. Resistance to disease is known as immunity 2. Natural and acquired are two types 3. Natural - sweat glands 4. 	
3	U	Give the immunisation schedule.	
		Ans:	

Sl. No.	Age	Vaccine	Dose
1	New born	BCG	-
2	Within 15 days	O Polio	-
3	6th week	DPT and Polio	First
4	10th week	DPT and Polio	Second
5	14th week	DPT and Polio	Third
6	9-12 months	Measles	One dose
7	18-24 months	DPT and Polio	First booster
8	15 months-2 years	MMR	
9	2-3 years	Typhoid	Two doses at one month interval
10	4-6 years	DPT and Polio	Second booster
11	10th year	TT and Typhoid	-
12	16th years	TT and Typhoid	Second dose

TOPIC 37 : POLLUTION

CONTENT POINTS : Definition - Types - Prevention

Q. No.	Obj.	Questions	Answers
MULTIPLE		CHOICE QUESTIONS	
1	K	The troposphere extends on the earth's surface upto A. 0-30 km B. 0-15 km C. 15-30 km D. 30-60 km	B
2	K	Ozone layer is found on earth A. 15-30 kms B. 30-60 kms C. 0-15 kms D. 0-30 kms	A
3	K	The stratosphere extends above troposphere upto A. 30 kms B. 15 kms C. 40 kms D. 60 kms	D
4	A	The percentage of CO_2 in the atmospheric air is A. 79% B. 20% C. 0.03% D. 0.3%	C

Q. No.	Obj.	Questions	Answers
5	U	Which of the following is responsible for the unpleasant smell of car engines ? A. CO_2 B. CO C. unburnt hydrocarbons D. CH_4	C
6	U	Smog is formed by the combination of smoke with A. water droplets B. CO_2 C. SO_2 D. CO	A
7	U	Which of the following gases combine with haemoglobin and reduces its oxygen carrying capacity ? A. CO_2 B. NO_2 C. CO D. C	C
8	A	The green house gas released by refrigerators is A. CO_2 B. CFC C. CO D. CH_4	B

Q. No.	Obj.	Questions	Answers
9	A	The secondary pollutant from car exhausts is A. CO_2 B. CH_4 C. O_3 D. CFC	C
10	A	Which of the following pollutants irritate nose, eye and lung ? A. SO_2 B. NO_2 C. Smoke D. CO_2	A
11	A	Very low concentration of lead affects the development of the following organ. A. Brain B. Lung C. Heart D. Kidney	A
12	A	Which is the gas that is leaked during Bhopal gas leak ? A. Methane B. Ethane C. Methyl isocynate D. CO_2	C

Q. No.	Obj.	Questions	Answers
13	A	Soil loses its texture due to A. land pollution B. non-degradable pollutants C. degradable pollutants D. acid rain	B
14	U	The permissible levels of noise in India is A. 80-100 dB B. 81-110 dB C. 100-120 dB D. 81-120 dB	D
FILL IN THE BLANKS			
1	K	Any undesirable change in the physical, chemical or biological characteristics of air, water and land is called _____.	pollution
2	K	The lower region of the atmosphere is called troposphere and the upper region is called_____.	stratosphere
3	U	The major particulate air pollutants are smoke and_____.	radioactive dust
4	U	Biologically active isotopes such as Strontium-90, Caesium-137 and Iodine-131 are the fission products of _____.	Uranium-235
5	U	Respiratory diseases such as bronchitis, emphysema and asthma are aggrevated by_____..	smoke
6	U	Smoke combines with droplets of water to form_____.	smog
7	U	_____ is a place where plants are grown in controlled condition.	Greenhouse

Q. No.	Obj.	Questions	Answers
8	U	The emitting of heat by green house gases results in_____.	global warming
9	U	Unburned hydrocarbons are probably _____.	carcinogenic
10	U	The subatomic particles of radioactive dusts are collectively known as _____.	ionising radiation
11	U	_____ leads to sterility, genetic defects and cancer.	Radiation

MATCH THE FOLLOWING

	A	B	
K	1. CO	a. Smog	1-f
K	2. CO_2	b. Uranium-235	2-c
K	3. CFC	c. Greenhouse gas	3-g
K	4. Thermal inversion	d. Ozone	4-a
K	5. Ionising radiation	e. SO_2	5-b
K	6. Eutrophication	f. Odourless toxic	6-k
K	7. Degradable pollutant	g. Refrigerator	7-l
K	8. Water borne disease	h. Cholera	8-h
K	9. Noise pollution	i. 0-15 kms height	9-n
K	10. Troposphere	j. Asthma	10-i
		k. Algal bloom	
		l. Domestic sewage	
		m. Aluminium	
		n. Alfred Bell	

Q. No.	Obj.	Questions	Answers
SHORT ANSWER			
1	K	Define pollution.	Ans: 1. Undesirable change 2. Air, water and land
2	K	What are pollutants ?	Ans: 1. The substances which cause pollution. Eg. CO, CO_2 in air 2. Deleterious effect on living organisms
3	U	How is acid rain formed ?	Ans: 1. C, S, N combining with O_2 2. Dissolving in rain water
4	U	What is green house effect ?	Ans: 1. Emission of heat due to CO_2 accumulation 2. Global warming 3. CO_2 is known as green-house gas and hence the effect green-house effect
5	K	Define ionising radiation.	Ans: 1. Subatomic particles of radioactive dust 2. Ionising - damage cells
6	K	What is thermal inversion ?	Ans: 1. Trapping cold air beneath warm air 2. Prevents escape of smoke
7	K	Mention the two types of water pollutants.	Ans: 1. Solid waste 2. Liquids
8	K	Define algal bloom.	Ans: 1. Enriched nutrient in the waer 2. Promote algal growth 3. Harmful to other aquatic organisms
9	K	Suggest two methods to control water pollution.	Ans: 1. Using of purified chemicals 2. Filtering 3. Effluent treatment

Q. No.	Obj.	Questions	Answers
10	U	Mention the two types of land pollutants.	Ans: 1. Degradable pollutants 2. Non-degradable pollutants
11	U	What are non-degradable pollutants ? Give example.	Ans: 1. No natural or artificial treatment 2. Aluminium, PVC, ceramics
12	K	Define noise.	Ans: 1. Unpleasant and unwanted sound 2. Latin word nausea
13	K	What is deciBel ?	Ans: 1. Measurement of sound 2. 81 dB to 120 dB
14	U	List the biological effects water pollution.	Ans: 1. Contains pathogens 2. Diseases like Cholera, Typhoid, Jaundice
LONG ANSWERS			
1	K	Give an account of air pollutants.	Ans: 1. Two types Smoke — Radioactive dust 2. Smoke - Automobiles, combustion of coal, industries, Co, CO_2, SO_2, NO_2, lead 3. Acid rain 4. Radioactive dust, atomic bomb test, nuclear power station, natural background, radiation from rocks and cosmic radiation from space.

Q. No.	Obj.	Questions Answers
2	U	List the biological effects of air pollution. Ans: 1. Smoke - bronchitis, emphysema and asthma 2. Thermal inversion - damage respiratory system and eyes. 3. CO - toxic, combines with Hb. 4. CO_2 - green house effect. 5. List of green house gases. 6. Ionising radiation 7. Lead - brain
3	U	List the control measures of air pollution. Ans: 1. UNEP 2. Planting trees 3. Spacing houses and colonies 4. Petrol free from adulteration 5. Less use of coal 6. Controlled nuclear tests 7. Strict safegaurds against disastrous gases let out from industries
4	U	Explain eutrophication. Ans: 1. Adding rich nurient waste to water 2. Algal bloom 3. O_2 content decreases 4. Affecting the aquatic organisms because of debris formation

Q. No.	Obj.	Questions Answers
5	U	Give an account of biological effects of land pollution. Ans. 1. Detergents - fertility 2. Tanneries - fertility 3. Insecticides and pesticides reaching water 4. Acid rain - global ecological problem 5. Ceramic, plastics, PVC, soil rigid and loses fertility
6	U	List the sources of noise pollution. Ans: 1. Industrial and non-industrial 2. Engines 3. Generators, grinders and compressors 4. Traffic on the road, rail, aircraft, loud speaker, radio, TV stations, etc.
7	U	List the biological effects of noise pollutions. Ans: 1. Mental disturbance 2. Violent behaviour 3. Cardiovascular problem 4. Heart diseases 5. Affects central nervous system 6. Peptic ulcers 7. Asthma 8. Output of urine reduced
8	A	Suggest the ways by which noise pollution can be controlled. Ans: 1. Old machine to be discorded which make noise and new machines to be replaced 2. Noise generators to be kept in factory far away from work place 3. Ear muffs 4. Planting trees 5. Hearing aids for workers