SURA'S

BIO-BOTANY

&

BOTANY

(Short version and Long version)

11th Standard

Salient Features

- Prepared as per the updated New Textbook for the year 2019.
- Exhaustive Additional MCQs (Questions, Match the following, Fill in the blanks, Choose the odd man out, Choose the incorrect/Correct pair, Assertion-Reason, Choose the correct or incorrect statement) are given in each chapter.
- Comprehensive Additional VSA, SA, LA, HOTS questions with answers are given in each chapter.
- All the diagrams are included and neatly labeled.
- Govt. Model Question Paper-2018, First Mid-Term Test, Quarterly Exam - 2018 and Half yearly Exam - 2018 Questions are incorporated at appropriate sections.
- **Govt. Model** Question Paper (Short version and Long version), **March-2019** Question paper, Half Yearly examination -2020 and Sura Model Question paper.
- Public Examination March 2020 Question Paper with Answers are given.

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CONTENTS

UNIT-I

DIVERSITY OF LIVING WORLD

Chapter 1

LIVING WORLD

CHAPTER SNAPSHOT

4. **Assembly and Maturation :**
   - (i) DNA of the phage and protein coat are synthesized separately, assembled to form phage particles.
   - (ii) This assembling process of the phage particles is known as **maturation**.
   - (iii) After 20 min of infection about 300 new phages are assembled.
5. **Release :**
   - (i) Maturation of phage particles starts and accumulate inside the host cell.
   - (ii) The phage particles are released by the lysis of host cell wall.

3. Explain sexual reproduction in Bacteria.

Ans. **Sexual Reproduction in Bacteria:** *[HY-2019]*

Typical sexual reproduction involving the formation and fusion of gametes is absent in bacteria. However gene recombination can occur in bacteria by three different methods. They are:

(i) Conjugation

(ii) Transformation

(iii) Transduction

(i) Conjugation

1. J. Lederberg and Edward L. Tatum demonstrated conjugation in E. coli. in the year 1946.
2. In this method of gene transfer the donor cell gets attached to the recipient cell with the help of pili.
3. The pilus grows in size and forms the conjugation tube.
4. The plasmid of donor cell which has the F+ (fertility factor) undergoes replication.
5. Only one strand of DNA is transferred to the recipient cell through conjugation tube.
6. The recipient completes the structure of double stranded DNA by synthesizing the strand that complements the strand acquired from the donor.

(ii) Transformation:

1. Transfer of DNA from one bacterium to another is called transformation.
2. In 1928 the bacteriologist Frederick Griffith demonstrated transformation in Mice using Diplococcus pneumoniae.
3. Two strains of this bacterium are present. One strain produces smooth colonies and are virulent in nature (S type) In addition another strain produced rough colonies and are avirulent (R type).
4. When S-type of cells were injected into the mouse, the mouse died. When R-type of cells were injected, the mouse survived.
5. He injected heat killed S-type cells into the mouse the mouse did not die.
6. When the mixture of heat killed S-type cells and R-type cells were injected into the mouse. The mouse died.
7. The avirulent rough strain of Diplococcus had been transformed into S-type cells.
8. The hereditary material of heat killed S-type cells had transformed R-type cell into virulent smooth strains.
9. Thus the phenomenon of changing the character of one strain by transferring the DNA of another strain into the former is called Transformation.

(iii) Transduction:

Zinder and Lederberg (1952) discovered Transduction in Salmonella typhimurum. Phage mediated DNA transfer is called Transduction.

Transduction is of two types:

(i) Generalized transduction

(ii) Specialized or Restricted transduction.

- **(i) Generalized Transduction:**
  The ability of a bacteriophage to carry genetic material of any region of bacterial DNA is called generalised transduction.
- **(ii) Specialized or Restricted Transduction:**
  The ability of the bacteriophage to carry only a specific region of the bacterial DNA is called specialized or restricted transduction.

Additional

Choose the Correct Answers 1 MARK

I. Choose the Correct options for the below Questions:

1. Identify the criteria not used for classification of viruses?

(a) –ss or – ds (b) Use of RT

(c) (+) RNA or (–) RNA (d) Reproduction

[Ans. (d) Reproduction]

UNIT-I

DIVERSITY OF LIVING WORLD

Chapter 2

PLANT KINGDOM

CHAPTER SNAPSHOT

6. List the salient features of Bryophytes.

Ans. **Salient features of Bryophytes :**

1. Plant body of bryophyte is gametophyte, not differentiated into root, stem and leaf like structure.
2. Most of them are primitive land dwellers. Some of them are aquatic (Riella, Ricciocarpus).
3. The gametophyte is conspicuous, long lived phase of the life cycle. Thalloid forms are present in liverworts and Hornworts.
4. In Mosses leaf like, stem like structures are present. In Liverworts thallus grows prostrate on the ground and is attached to the substratum by means of rhizoids.
5. Vascular tissues Xylem and Phloem are absent, so called Non vascular cryptogams.
6. Vegetative reproduction takes place by the formation of adventitious buds (Riccia fluitans). Tubers develop in Anthoceros. Gemmae are formed in Marchantia.
7. Sexual reproduction is oogamous. Antheridia and Archegonia are produced in a protective covering and are multicellular.
8. The antheridia produces biflagellate antherozoids which swims in thin film of water and reach the archegonium and fuse with the egg to form **diploid zygote**.
9. Water is essential for fertilization.
10. The zygote is the first cell of the sporophyte generation. It undergoes mitotic division to form multicellular undifferentiated embryo. The embryogeny is exoscopic. The embryo divides and give rise to sporophyte.
11. The sporophyte is dependent on gametophyte.
12. It is differentiated in to three recognizable parts namely foot, seta and capsule.
13. The foot is the basal portion and is embedded in the gametophyte through which water and nutrients are supplied for the sporophyte.
14. The diploid spore mother cells found in the capsule region undergoes meiotic division and give rise to haploid spores.
15. In some sporophytes Elaters are present and help in dispersal of spores. Eg: Marchantia.
16. Bryophytes are homosporous.
17. The zygote, embryo and the sporogonium constitute sporophytic phase. The green long living haploid phase is called **gametophytic phase**.
18. The haploid gametophytic phase alternates with diploid and shows heterologous alternation of generation.

7. Write the general characteristic features of Gymnosperms.

Ans. Gymnosperms are naked seed bearing plants.

1. Most of the Gymnosperms are evergreen woody trees or shrubs. Some are lianas (*Gnetum*).
2. The plant body is sporophyte and is differentiated into root, stem and leaves.
3. A well developed Tap root system is present. Coralloid Roots of *Cycas* have symbiotic association with blue green algae. In Pinus the roots have mycorrhizae.
4. The stem is aerial, erect and branched or unbranched (*Cycas*) with leaf scars.
5. In conifers, two types of branches namely branches of limited growth (Dwarf shoot) and Branches of unlimited growth (Long shoot) is present.
6. Leaves are dimorphic, foliage and scale leaves are present. Foliage leaves are green, photosynthetic and borne on branches of limited growth. They show xerophytic features.
7. The xylem consists of tracheids but in *Gnetum* and *Ephedra* vessels are present.
8. Secondary growth is present. The wood may be manoxylic (Porous, soft, more parenchyma with wide medullary ray -*cycas*) or pycnoxylic (compact with narrow medullary ray-*Pinus*).
9. They are heterosporous. The plant may be monoecious (*Pinus*) or dioecious (*Cycas*).
10. Microsporangia and megasporangia are produced on microsporophyll and megasporophyll respectively.
11. Male and female cones are produced.
12. Anemophilous pollination is present.
13. Fertilization is siphonogamous and pollen tube helps in the transfer of male nuclei.
14. Polyembryony (presence of many embryo) is present. The naked ovule develops into seed. The endosperm is haploid and develop before fertilization.
15. The life cycle shows alternation of generation. The sporophytic phase is dominant and gametophytic phase is highly reduced.

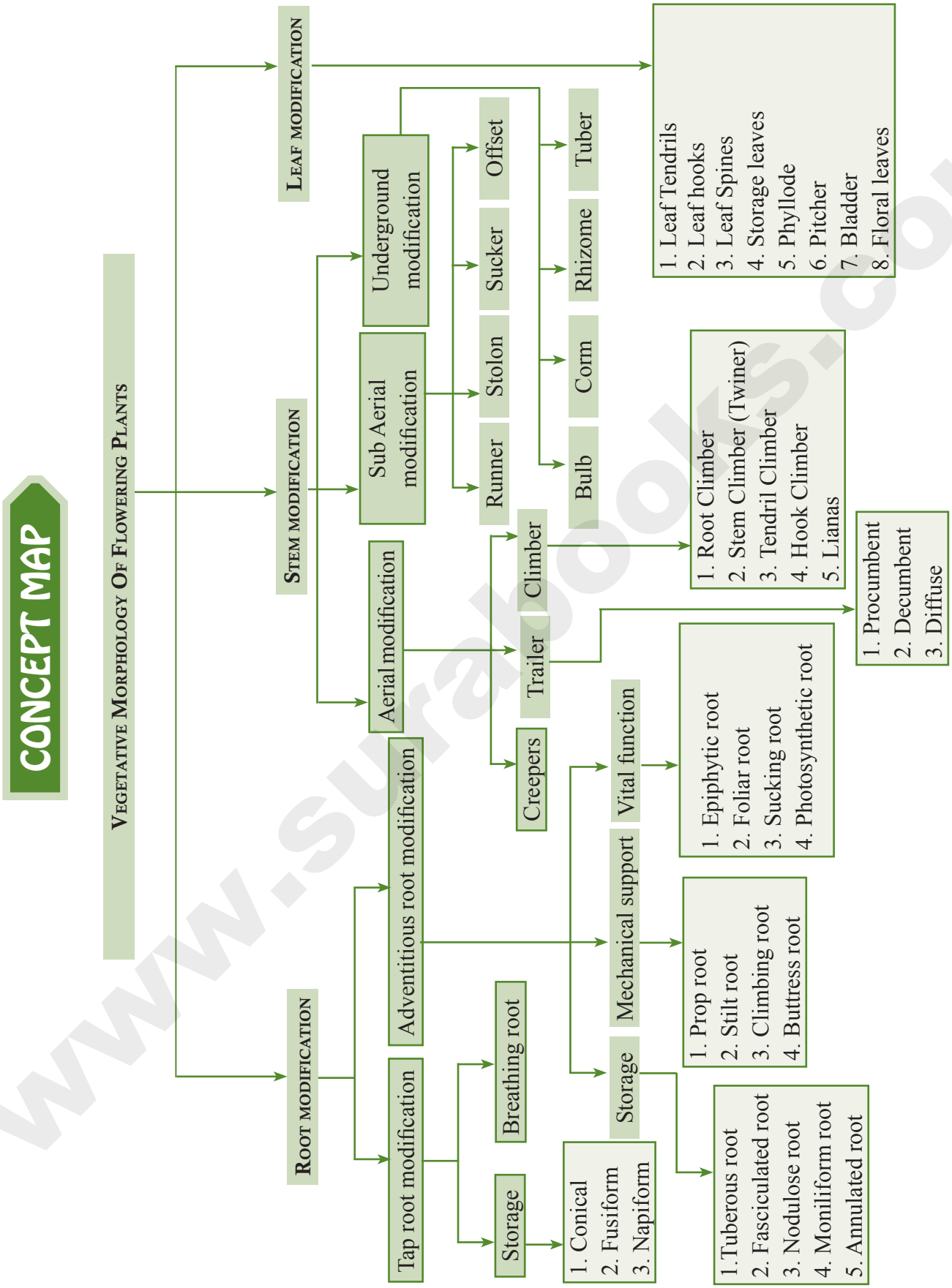
UNIT-II

PLANT MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS

Chapter 3

VEGETATIVE MORPHOLOGY

CHAPTER SNAPSHOT



UNIT-II

PLANT MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS

Chapter 4

REPRODUCTIVE MORPHOLOGY

CHAPTER SNAPSHOT

Evaluation

1. Vexillary aestivation is characteristic of the family *[March-2019]*

(a) Fabaceae (b) Asteraceae
(c) Solanaceae (d) Brassicaceae

[Ans. (a) Fabaceae]

2. Gynoecium with united carpels is termed as

(a) Apocarpous (b) Multicarpellary
(c) Syncarpous (d) None of the above

[Ans. (c) Syncarpous]

3. Aggregate fruit develops from

(a) Multicarpellary, apocarpous ovary
(b) Multicarpellary, syncarpous ovary
(c) Multicarpellary ovary
(d) Whole inflorescence **[Ans. (a) Multicarpellary, apocarpous ovary]**

4. In an inflorescence where flowers are borne laterally in an acropetal succession the position of the youngest floral bud shall be

(a) Proximal (b) Distal
(c) Intercalary (d) Anywhere

[Ans. (b) Distal]

5. A true fruit is the one where

(a) Only ovary of the flower develops into fruit
(b) Ovary and calyx of the flower develops into fruit
(c) Ovary, calyx and thalamus of the flower develops into fruit
(d) All floral whorls of the flower develops into fruit

[Ans. (a) Only ovary of the flower develops into fruit]

6. Find out the floral formula for a bisexual flower with bract, regular, pentamerous, distinct calyx and corolla, superior ovary without bracteole.

Ans. Br., Ebrl., ⊕, ⚥, K_5, C_5, C_{10}, $\underline{G}_{(3)}$.

Note: No of stamens has been taken as 10. Not mentioned in the question. Similarly No of carpels has been taken as 5.

7. Give the technical terms for the following:

(a) A sterile stamen
(b) Stamens are united in one bunch
(c) Stamens are attached to the petals

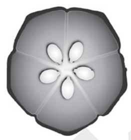
Ans. **(a)** Staminode **(b)** Monadelphous
(c) Epipetalous

8. Explain the different types of placentation with example. *[March-2019]*

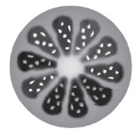
Ans. The mode of distribution of placenta inside the ovary is called placentation. Placenta bears the ovules. Different types as follows:

1. **Marginal:** It is with the placentae along the margin of a unicarpellate ovary. Eg: Fabaceae.

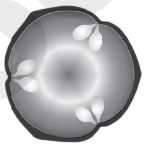
2. **Axile :** The placentae arises from the column in a compound ovary with septa. Eg: *Hibiscus,* tomato, lemon.



3. **Superficial:** Ovules arise from the surface of the septa. Eg: Nymphaeaceae.



4. **Parietal:** It is the placentae on the ovary walls or upon intruding partitions of a unilocular, compound ovary. Eg: Mustard, Argemone, cucumber.



5. **Basal:** It is the placenta at the base of the ovary. Eg: Sunflower, Marigold.

6. **Free-central:** It is with the placentae along the column in a compound ovary without septa. Eg: Caryophyllaceae, Dianthus, Primrose.

9. Differentiate between aggregate fruit with multiple fruit.

Ans.

No.	Aggregate fruit	Multiple fruit
1.	It is formed from a single flower with apocarpous pistil. Each free carpel develops into a fruitlet.	It is formed from whole inflorescence.
2.	It is a group or etaerio of fruitlets.	Many fruitlets form a composite fruit.
3.	It can be compact (Annona) or loose (*polyalthia*).	It is Compact.
4.	Eg: *Annona, Polyalthia.*	Eg: Pineapple, Jack fruit.

UNIT-II

PLANT MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS

Chapter 5

TAXONOMY AND SYSTEMATIC BOTANY

CHAPTER SNAPSHOT

MUST KNOW DEFINITIONS

Taxonomy	:	Taxonomy as "the science dealing with the study of classification including the principles, rules and procedures".
Systematics	:	Systematics as "Scientific study of the kinds and diversity of organisms and all relationships between them".
Taxonomic hierarchy	:	It is the arrangement of various taxonomic levels in descending order starting from kingdom up to species.
Kingdom	:	Kingdom is the highest level or rank of the Taxonomic hierarchy.
Division	:	It is the next level of classification after 'kingdom' that consists of number of classes.
Class	:	It consists of group of orders which share few similarities.
Order	:	It includes group of families which show less similarities among them.
Family	:	It comprises a number of genera which share some similarities among themselves.
Genus	:	It consists of multiple species which have similar characters but differ from the species of another genus.
Species	:	It is the lowest rank of classification and shows the highest level of similarities among the organisms. Species is the fundamental unit of taxonomic classification.
Morphological species (Taxonomic species)	:	When the individuals are similar to one another in one or more features and different from other such groups are called **Morphological speices.**
Biological species (Isolation Species)	:	These are groups of populations that inter breed and are reproductively isolated from other such groups in nature.
Phylogenetic species	:	Phylogenetic species as an evolutionary species is a single lineage of ancestor descendent populations which maintains its such linages identity from other such lineages.
Nomenclature	:	Assigning name for a plant is known as **Nomenclature.**
Vernacular names (Common names)	:	They are very often descriptive and poetic references to plants. It refers to more than one plant or many plants may have same common name.
Scientific names	:	ICN assigns a name for individual plant group which is known as scientific name.
Polynomial	:	Polynomial included a single word for a plant followed by a lengthy list of discriptive terms in Latin. It was followed earlier but now-a-days only binomial is universally followed.
Binomial	:	Scientific name of a species consists of two words. According to **Binomial nomenclature,** the first name is called genus and second one is scientific **Epithet.** Eg: ***Mangifera india.*** ***Mangifera*** is a **genus** name and ***indica*** is specific epithet.
Author Citation	:	This refers to valid name of the taxa accompanied by the author's name who published the name validly. Eg: ***Solanum americanum.L*** **(L stands for Linnaeus)**
Type concept	:	Specimen must be associated with the scientific name known as **Nomenclatural type.** This is either a specimen or may be an illustration.
Taxonomic Aids	:	Taxonomic aids are the tools for the taxonomic study.
Keys	:	Taxonomic keys are the tools for the identification of unfamiliar plants.
Dichotomous type	:	The most common type of key.

2. Artificial system of classification is also known as _____ of classification. *[QY-2018]*

(a) Natural system (b) Phylogenetic system
(c) Bio-systematic (d) Sexual system

[Ans. (d) Sexual system]

3. _____ is known as Father of Botany. *[QY-2019]*

(a) John Ray (b) Theophrastus
(c) Bauhin (d) Linnaeus

[Ans. (b) Theophrastus]

Very Short Answers — 2 MARKS

1. Find out the floral formula for a unisexual female flower with bract and without bracteolate trimerous with indisinct calyx and corolla with Trilocular superior ovary. *[QY-2019]*

Ans. Br., Ebrl., ⊕, ♀, $P_{(3+3)}$, A_0 $\underline{G}_{(3)}$.

2. What is Biosystematics? *[HY-2018]*

Ans. 1. Biosystematics is an "Experimental, ecological and cytotaxonomy" through which life forms are studied and their relationships are defined.

2. The term biosystematics was introduced by **Camp & Gilly** in 1943.

Short Answers — 3 MARKS

1. Write the major class of seed plants. *[QY-2018]*

Ans. **Phanerorgams :** Seed producing plants. They are **Gymnosperms :** They are naked seed producing plants. **Eg:** a) Cycas, b) Thuja c) Taxus, d) Ginkgo. **Angiosperms :** Seeds are enclosed by fruit which is formed by ovary. **Eg:** *Mangifera indica*, *Musa*

2. Write three uses of Herbarium? *[QY-2019]*

Ans. 1. Herbarium provides resource material for systematic research and studies.

2. It is a place for orderly arrangement of voucher specimens.

3. Voucher specimen serves as a reference for comparing doubtful newly collected fresh specimens.

4. Voucher specimens play a role in studies like floristic diversity, environmental assessment, ecological mechanisms and survey of unexplored areas.

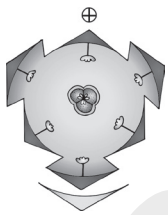
5. Herbarium provides opportunity for documenting biodiversity and studies related to the field of ecology and conservation biology.

3. Draw the floral diagram and write the floral formula of Allium cepa. *[HY-2019]*

Ans. **Floral Formula:**

Br., Ebrl., ⊕, ♀, $P_{(3+3)}$, A_{3+3}, $\underline{G}_{(3)}$.

Floral diagram :



Long Answers — 5 MARKS

1. Describe the Floral characters of *Allium Cepa* with a neat floral diagram. *[March-2019]*

Ans. **Floral Characters :**

1. **Inflorescence:** Scapigerous i.e. the inflorescence axis (peduncle) arising from the ground bearing a cluster of flowers at its apex. Pedicels are of equal length, arising from the apex of the peduncle which brings all flowers at the same level.

2. **Flower:** Small, white, bracteate, ebracteolate, pedicellate, complete, trimerous, actinomorphic and hypogynous. Flowers are protandrous.

3. **Perianth:** Tepals 6, white, arranged in two whorls of three each, syntepalous showing valvate aestivatikon.

4. **Androecium:** Stamens 6, arranged in two whorls of three each, epiphyllous, apostamenous /free and opposite to tepals. Anthers dithecous, basifixed, introse, and dehiscing longitudinally.

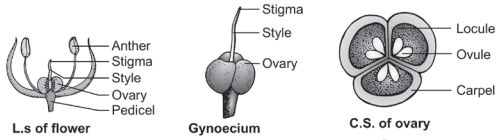
8. **Gynoecium:** Tricarpellary and syncarpous. Ovary superior, trilocular with two ovules in each locule on axile placentation. Style simple, slender with simple stigma.

7. **Fruit:** A loculicidal capsule.

8. **Seed:** Endospermous.

9. **Floral Formula:**

Br., Ebrl., ⊕, ♀, $P_{(3+3)}$, A_{3+3}, $\underline{G}_{(3)}$.



UNIT-III

CELL BIOLOGY AND BIOMOLECULES

Chapter 6

CELL: THE UNIT OF LIFE

CHAPTER SNAPSHOT

7. Distinguish between prokaryotes and eukaryotes. *[QY-2018]*

Ans.

Features	Prokaryotes	Eukaryotes
Nuclear character	Nuclear material is called Nucleoid and not bound by nuclear membrane.	A well designed nucleus with nuclear membrane is seen.
Histones	DNA is not associated with histone protein.	DNA is associated with histone protein.
Organelles	Membrane bound organelles like Mitochondria, Plastids, Golgi are absent. Eg : Bacteria.	Membrane bound organelles are present. Eg: Higher plants.
Ribosomes.	Ribosomes (50s + 30s) type.	Ribosomes (60s + 40s type.
DNA	DNA is usually circular.	DNA is usually linear.
Cell division	Cell division occurs by Binary fission.	Cell division occurs by Mitosis and Meiosis.

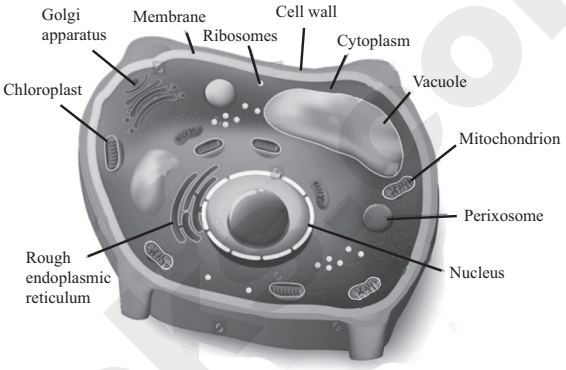
8. Difference between plant and animal cell.

Ans.

No.	Plant cell	Animal cell
1	Usually they are larger than animal cells.	Usually smaller than plant cells.
2	Cell wall present in addition to plasma membrane and consists of middle lamellae, primary and secondary walls.	Cell wall absent.
3	Plasmodesmata present.	Plasmodesmata absent.
4	Chloroplast present.	Chloroplast absent.
5	Vacuole large and permanent.	Vacuole small and temporary.
6	Tonoplast present around vacuole.	Tonoplast absent.
7	Centrioles absent except motile cells of lower plants.	Centrioles present.
8	Nucleus present along the periphery of the cell.	Nucleus at the centre of the cell.
9	Lysosomes are rare.	Lysosomes present.
10	Storage material is starch grains.	Storage material is a glycogen granules.

9. Draw the ultra structure of plant cell.

Ans.



Ultra Structure of Plant Cell

GOVERNMENT EXAM QUESTIONS

Bio-Botany (Short version)

CHOOSE THE CORRECT ANSWERS 1 MARK

1. Regarding flip-flop movement, which one of the following statement is correct? *[Govt. MQP-2018]*

(a) Proteins can flip-flop, lipids cannot
(b) Neither lipids nor proteins can flip-flop
(c) Both lipids and proteins can flip-flop
(d) Lipdis can rarely flip-flop, proteins cannot

[Ans. (d) Lipdis can rarely flip-flop, proteins cannot]

2. German botanist Matthias Schleiden and German Zoologist Theodor Schwann proposed cell theory in _____ . *[QY-2018]*

(a) 1833 (b) 1883
(c) 1863 (d) 1933 **[Ans. (a) 1833]**

3. Ribosomes were first observed by _____ *[HY-2018]*

(a) Christian de Duve (b) George Palade
(c) A.Kolliker (d) A.F.U.Schimper

[Ans. (d) A.F.U.Schimper]

UNIT-III

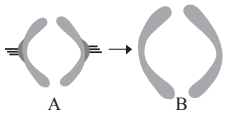
CELL BIOLOGY AND BIOMOLECULES

Chapter 7

CELL CYCLES

CHAPTER SNAPSHOT

3. **Identify the name of the phases of the below diagram.**



	A	B
(a)	Metaphase	Anaphase
(b)	Telophase	Prometaphase
(c)	Prometaphase	Metaphase
(d)	Anaphase	Telophase

[Ans. (d) A-Anaphase, B-Telophase]

VIII. Identify the Correct pair from the below :

1.

(a)	Amitosis	-	Indirect cell division
(b)	Karyokinesis	-	Cytoplasm
(c)	Cytokinesis	-	Nucleus
(d)	Mitosis	-	Equational division

[Ans. (d) Mitosis - Equational division]

2.

(a)	Dyad of cells	-	haploid
(b)	Tetrads	-	Chiasmata
(c)	X-shape	-	Bivalent
(d)	Pachytene	-	Synapsis

[Ans. (a) Dyad of cells - haploid]

IX. Identify the Incorrect pair from the below :

1.

(a)	Bipolar spindle	-	Cytoplasmic fibres of protein
(b)	Prophase	-	Chromosome made up of two chromatids and centromere
(c)	Anaphase	-	Equatorial plate
(d)	Metaphase	-	Kinetochore

[Ans. (c) Anaphase - Equatorial plate]

2.

(a)	G_2 phase	-	Growth phase
(b)	M phase	-	Interphase
(c)	S phase	-	DNA synthesis
(d)	G_1 phase	-	RNA and DNA synthesis

[Ans. (b) M phase - Interphase]

X. Identify the Odd-man out from the below :

1. (a) Haplostele (b) Solenostele (c) Actinostele (d) Plectostele

[Ans. (b) Solenostele]

Reason: Solenostele is a type of Siphonostele. Others are the type of Protostele.

2. (a) Glyoxysome (b) Phosphate granules (c) Carboxysomes (d) Gas vacuoles

[Ans. (a) Glyoxysome]

Reason: Glyoxysome is a single membrane bound organelle. Others are the reserve materials of prokaryotes.

Competitive Examination Questions

1. **Omnis-cellula-e-cellula was given by** (2007 AIIMS)

(a) Virchow (b) Hooke (c) Leeuwenhoek (d) Robert Brown

[Ans. (a) Virchow]

2. **Which of the following is responsible for the mechanical support, protein synthesis and enzyme transport** (2007 AIIMS)

(a) cell membrane (b) mitochondria (c) dictyosomes (d) endoplasmic reticulum

[Ans. (d) endoplasmic reticulum]

Very Short Answers — 2 MARKS

1. **What are the drawbacks of amitosis?**

Ans. 1. Causes unequal distribution of chromosomes.
2. Can lead to abnormalities in metabolism and reproduction.

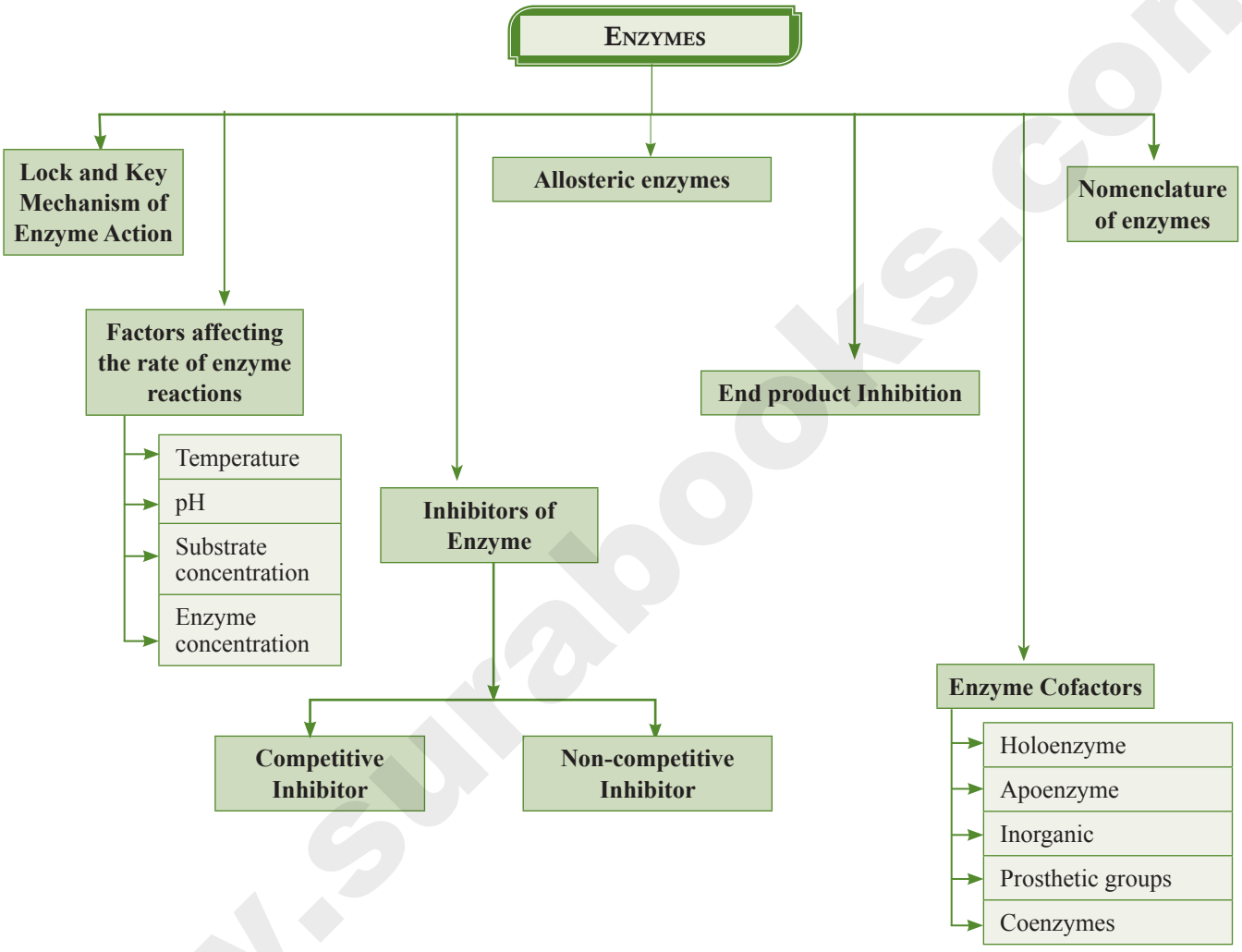
2. **What are APC?**

Ans. 1. Anaphase–Promoting Complex Cyclosome (APC/C) is a *ubiquitine ligase.*
2. It is a cluster of proteins that induces breaking down of cohesion proteins thus facilitating the separation of chromatids during mitosis.

3. **What is closed mitosis?**

Ans. In closed mitosis, the nuclear envelope remains intact and Chromosomes migrate to opposite poles of a spindle within the nucleus.
Eg: **Yeast and Slime molds.**

CONCEPT MAP



2. (a) Alkaloids - Abrin
(b) Toxins - Ricin
(c) Drugs - Curcumin
(d) Pigments - anthocyanins

[Ans. (a) Alkaloids - Abrin]

3. (a) Protein - Important components of nucleus.
(b) Nucleic acid - Major components of chromosomes.
(c) Amino acid - An amphoteric compound.
(d) Enzymes - Colloidal catalysts.

[Ans. (d) Enzymes - Colloidal catalysts]

X. Identify the Odd-man out from the below :

1. (a) Mushroom (b) Crab
(c) Prawn (d) Mosquito

[Ans. (d) Mosquito]

Reason: Mosquito cell walls are not made up of Chitin. Mushroom cell walls and Crab and Prawn shells are made of Chitin.

2. (a) Lysine (b) Arginine
(c) Histidine (d) Aspartate

[Ans. (d) Aspartate]

Reason: Aspartate is the type of negatively charged R group Amino acids. Other are positively charged R group Amino acids.

Competitive Examination Questions

1. **In mitochondria the enzyme cytochrome oxidase is present in** **(2012 JIPMER)**
(a) Outer mitochondrial membrane
(b) inner mitochondrial membrane
(c) Stroma
(d) Grana

[Ans. (b) inner mitochondrial membrane]

2. **Sequences of which of the following is used to know the phylogeny** **(2002 JIPMER)**
(a) mRNA (b) rRNA
(c) tRNA (d) Hn RNA

[Ans. (b) rRNA]

Very Short Answers 2 MARKS

1. **What are macromolecules? Give example.**

Ans. **Macromlecules:** Simple molecules assemble and form large and complex molecules called macromolecules.
Examples: These include four main classes – carbohydrates, lipids, proteins and nucleic acids.

2. **Write the test for starch.**

Ans. Presence of starch can be tested by adding a solution of iodine in potassium iodide to it. Blue-black colour is obtained if starch is present.

3. **Mention two uses of cellulose.**

Ans. 1. Cellulose fibres are found in cotton.
2. Nitrocellulose is used in explosives.

4. **What are unsaturated lipids?**

Ans. 1. Lipids are made of fatty acids which are carboxylic acid of long chain hydrocarbons.
2. In unsaturated fatty acids the hydrocarbon chain is double bonded. Eg: Oleic acid.

5. **What are polypeptides?**

Ans. 1. The amino group of one amino acid reacts with carboxyl group of other amino acid, forming a peptide bond.
2. Long strings of amino acids linked by peptide bonds are called **polypeptides.**

6. **What is a prosthetic group?**

Ans. 1. **Prosthetic groups** are organic molecules that assist in catalytic function of an enzyme.
2. **Flavin Adenine Dinucleotide (FAD)** contains riboflavin (vit B2), the function of which is to accept hydrogen.

7. **What is meant by activation energy?**

Ans. 1. In a enzyme catalysed reaction, the starting substance is the substrate.
2. It is converted to the product.
3. The substrate binds to the specially formed pocket in the enzyme – the **active site**, this is called **lock** state and this minimum energy needed is called the **activation energy**.

UNIT-IV

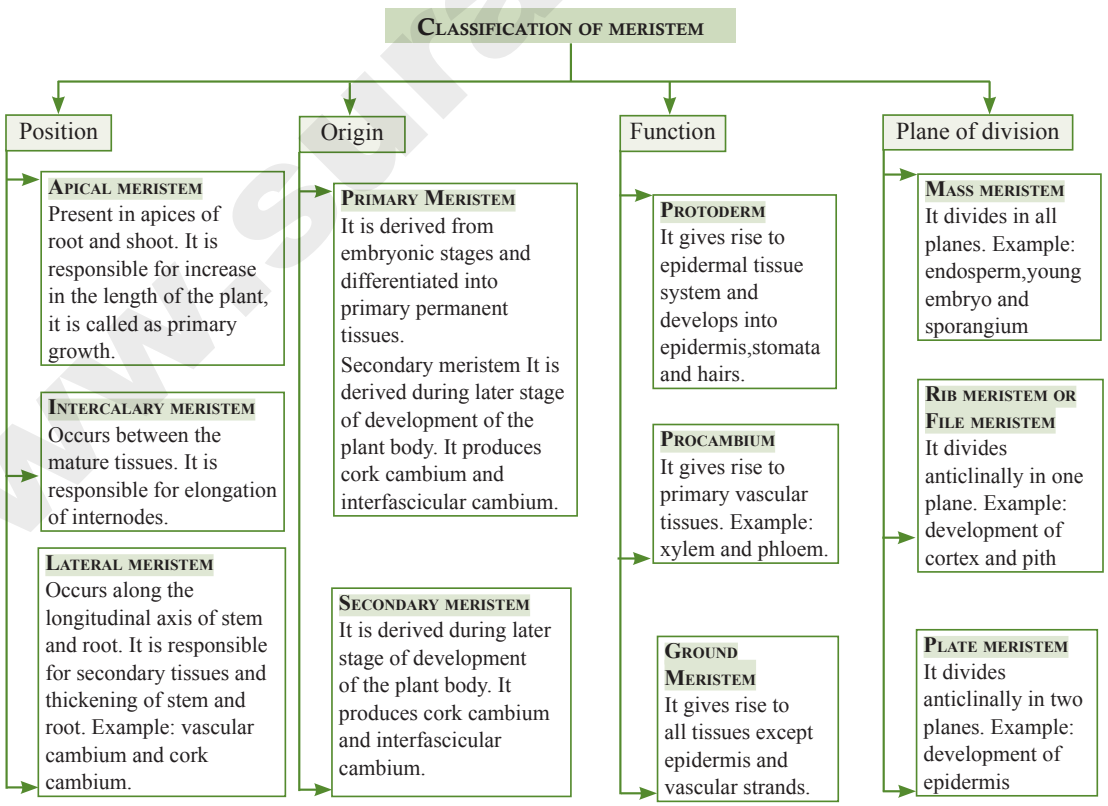
PLANT ANATOMY
(STRUCTURAL ORGANISATION)

Chapter 9

TISSUE AND TISSUE SYSTEM

CHAPTER SNAPSHOT

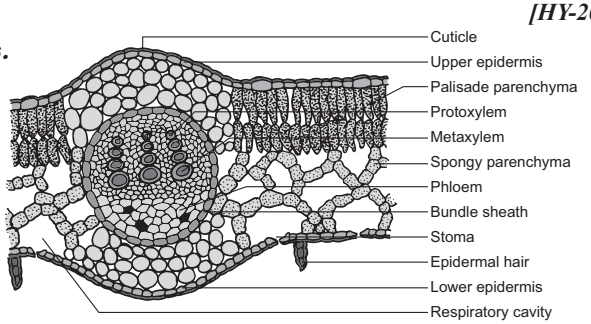
CONCEPT MAP



Long Answers 5 MARKS

1. Draw and label the parts of T.S.of Dicot leaf *[HY-2018]*

Ans.

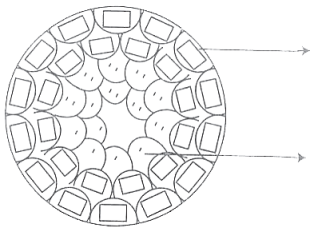


T.S. of Dicot Leaf (Sunflower)

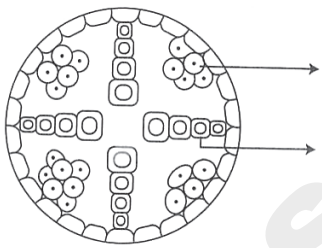
2. (a) (i) Draw and lable the internal structure of Nerium leaf. *[March-2019]*

(ii) Name the following Vascular Bundle.

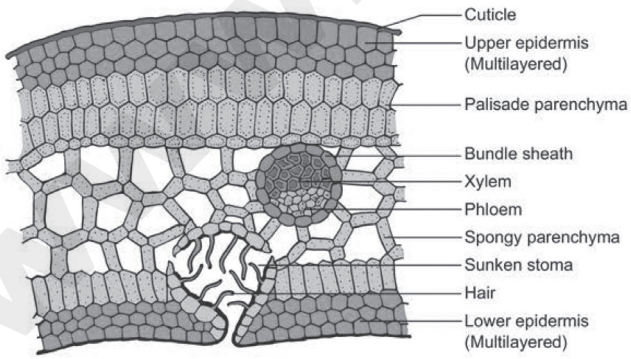
(A)



(B)



Ans. **i) Internal Structure of Nerium Leaf :**



ii) Vascular Bundle :

A) Concentric Amphivasal vascular bundle

B) Radial arrangement

Additional

Choose the Correct Answers 1 MARK

I. Choose the Correct options for the below Questions:

1. Who proposed Tunica corpus theory?

(a) Henstein (b) Strassburgur
(c) Schmidt (d) Hofmeister

[Ans. (c) Schmidt]

2. Which of the following is not a function of epidermis?

(a) Protection of internal tissues.
(b) Exchange of gases.
(c) Providing mechanical strength and flexibility.
(d) Minimising surface transpiration.

[Ans. (c) Providing mechanical strength and flexibility]

3. Who is the Father of Plant Anatomy?

(a) Esau (b) Nehemiah
(c) Linnaeus (d) Leeuwenhock

[Ans. (b) Nehemiah]

4. How many types of wood fibres?

(a) 3 (b) 5 (c) 4 (d) 2

[Ans. (c) 4]

5. Which is the are modified stomata?

(a) Guard cells (b) Bulliform cells
(c) Motor cells (d) Hydathodes

[Ans. (d) Hydathodes]

II. Choose the Correct options for the below Fill in the blanks:

1. In a vertical section of a typical dicot leaf, the phloem in the mid-vein is situated at _____.

(a) Facing the lower epidermis
(b) Facing the upper epidermis
(c) Facing sideways
(d) All around the xylem

[Ans. (a) Facing the lower epidermis]

UNIT-IV

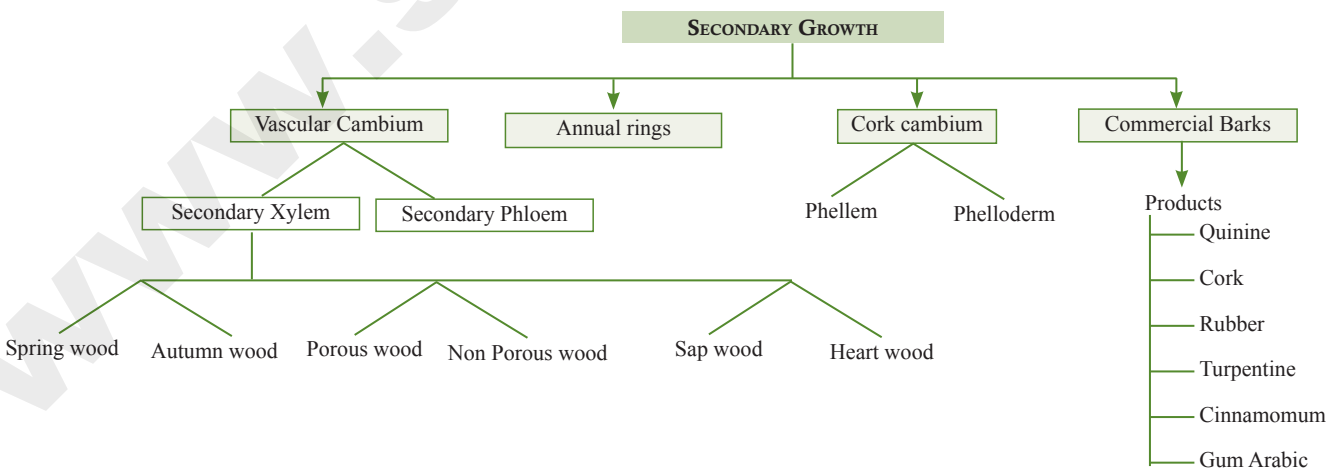
PLANT ANATOMY
(STRUCTURAL ORGANISATION)

Chapter 10

SECONDARY GROWTH

CHAPTER SNAPSHOT

CONCEPT MAP



Reason:

(i) In the cross section of the tree trunk, the lighter (spring wood) and darker (Autumn wood) rings appear in the form of concentric circles.

(ii) One spring wood circle and one autumn wood circle together constitute an annual ring.

(iii) Thus one dark and one light ring would have been formed every year.

(iv) 60 dark and 60 light rings indicate the age of the tree as 60 years.

10. A transverse section of the trunk of a tree shows concentric rings which are known as growth rings. How are these rings formed? What are the significance of these rings?

Ans. (i) The activity of vascular cambium is under the control of many physiological and environmental factors.

(ii) In the spring season, cambium is very active and produces a large number of xylary elements having vessels/tracheids with wide lumen.

(iii) The wood formed during this season is called **spring wood or early wood**. The tracheary elements are fairly thin walled.

(iv) In winter, the cambium is less active and forms fewer xylary elements that have narrow vessels/ tracheids and this wood is called **autumn wood or late wood**.

(v) The tracheary elements are with narrow lumen, very thick walled.

(vi) The spring wood is lighter in colour and has a lower density whereas the autumn wood is darker and has a higher density.

(vii) The annual ring denotes the combination of early wood and late wood and the ring becomes evident to our eye due to the high density of late wood.

(viii) Sometimes annual rings are called growth rings but it should be remembered all the growth rings are not annual.

(ix) Additional growth rings are developed within a year due to adverse natural calamities like drought, frost, defoliation, flood, mechanical injury and biotic factors during the middle of a growing season,which results in the formation of more than one annual ring. Such rings are called **pseudo- or false- annual rings**.

(x) Each annual ring corresponds to one year's growth and on the basis of these rings, the age of a particular plant can easily be calculated.

(xi) The determination of the age of a tree by counting the annual rings is called **dendrochronology**.

Significance of growth ring:

(i) Age of wood can be calculated.

(ii) The quality of timber can be ascertained.

(iii) Radio-Carbon dating can be verified.

(iv) Past climate and archaeological dating can be made.

(v) Provides evidence in forensic investigation.

Botany Long Version Questions (for pure science Group)

Long Version Evaluation

1. Refer Evaluation Q.No.1

2. Refer Evaluation Q.No.2

3. Refer Evaluation Q.No.3

4. Inner, darker & harder portion of secondary xylem that cannot conduct water in an older dicot stem is called

(a) Alburnum (b) Bast
(c) Wood (d) Duramen

[Ans. (d) Duramen]

5. The common bottle cork is a product of

(a) Phellem (b) Phellogen
(c) Xylem (d) Vascular cambium

[Ans. (b) Phellogen]

6. Refer Evaluation Q.No.4

Assertion and Reason:

7. These questions consist of two statements each printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.

A. If both Assertion and Reason are true but the Reason is a correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

UNIT-V

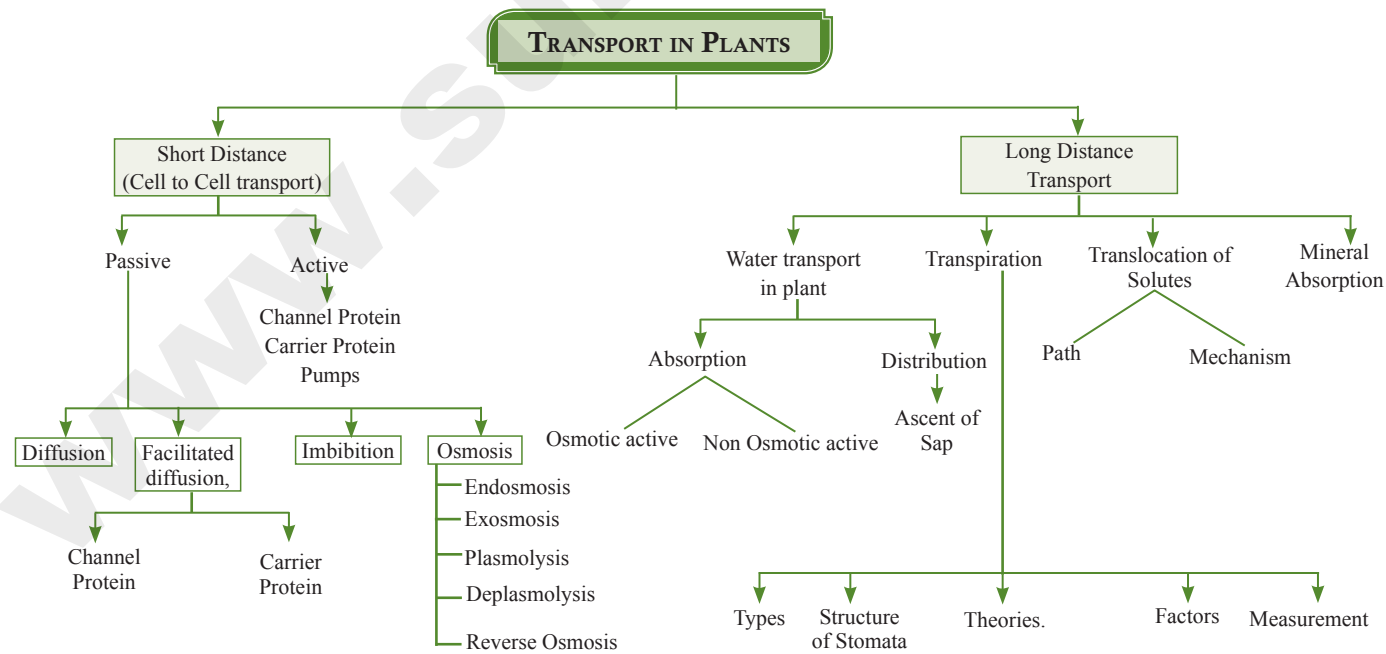
PLANT PHYSIOLOGY
(FUNCTIONAL ORGANISATION)

Chapter 11

TRANSPORT IN PLANTS

CHAPTER SNAPSHOT

CONCEPT MAP



2. (a) Imbibition theory - sachs
(b) Capillary theory - Boehm
(c) Cohesion-tension theory - Dixon
(d) Root pressure theory - Stoking

[Ans. (c) Cohesion-tension theory - Dixon]

IX. Identify the Incorrect pair from the below :

1. (a) Stress hormone - Abscisic acid
(b) Ganongs potometer - Rate of transpiration
(c) Necessary evil - Curtis
(d) Succinic acid - Opening of stomata

[Ans. (d) Succinic acid - Opening of stomata]

2. (a) Cladode - Cladophyll
(b) Subsidiary cells - Accessory cells
(c) Kens-shaped spots - Stomata
(d) Phosphorylase - Guard cells

[Ans. (c) Kens-shaped spots - Stomata]

X. Identify the Odd-man out from the below :

1. (a) Colourless Plastics (b) Silicone oil
(c) Low viscosity waxes (d) Malic acid

[Ans. (d) Malic acid]

Reason: In guard cell, starch is converted into organic acid (malic acid). Colourless plastics, Silicone oil and Low viscosity waxes are sprayed on leaves forming a thin film to act as a physical barrier.

2. **Identify the odd-man out regarding "Colloidal systems".**
(a) Gum (b) starch
(c) sugar (d) proteins

[Ans. (c) sugar]

Reason: Colloidal systems such as gum, starch, proteins, when placed in water, will absorb a large volume of water and swell up, but sugar is not a colloidal system.

3. **Identify the odd-man out regarding "protein - lecithin theory".**
(a) phosphatidic acid (b) ATP
(c) Choline (d) Dehydrogenase

[Ans. (d) Dehydrogenase]

Reason: Except "Dehydrogenase" all the three are the enzymes involved in "Protein-lecithin theory".

Competitive Examination Questions

1. **The water potential of pure water is** (NEET 2017)
(a) Less than zero
(b) More than zero but less than one
(c) More than one
(d) Zero [Ans. (d) Zero]

2. **Transpiration and root pressure cause water to rise in plants by** (NEET 2015)
(a) pulling it upward
(b) pulling and pushing it, respectively
(c) pushing it upward
(d) pushing and pulling it, respectively

[Ans. (b) pulling and pushing it, respectively]

3. **Movement of ions or molecules in a direction opposite to that of prevailing electro-chemical gradient is known as** (C.B.S.E. 2000)
(a) Active transport (b) Pinocytosis
(c) Brownian movement (d) Diffusion

[Ans. (a) Active transport]

4. **Correct sequence of events in wilting?** (P.M.T. Kerala 2001)
(a) Exosmosis-deplasmolysis-temporary and permanent wilting
(b) Exosmosis-plasmolysis-temporary and permanent wilting
(c) Endosmosis-plasmolysis-temporary and permanent wilting
(d) Endosmosis-deplasmolysis - temporary and permanent wilting
(e) Exosmosis-deplasmolysis-plasmolysis - temporary and permanent wilting

[Ans. (b) Exosmosis-plasmolysis- temporary and permanent wilting]

UNIT-V

PLANT PHYSIOLOGY
(FUNCTIONAL ORGANISATION)

Chapter 12

MINERAL NUTRITION

CHAPTER SNAPSHOT

Evaluation

1. Identify correct match.

1. Die back disease of citrus - (i) Mo
2. Whip tail disease - (ii) Zn
3. Brown heart of turnip - (iii) Cu
4. Little leaf - (iv) B

(a) 1 (iii) 2 (ii) 3 (iv) 4 (i)
(b) 1 (iii) 2 (i) 3 (iv) 4 (ii)
(c) 1 (i) 2 (iii) 3 (ii) 4 (iv)
(d) 1 (iii) 2 (iv) 3 (ii) 4 (i)

[Ans. (b) 1 (iii), 2 (i), 3 (iv), 4 (ii)]

2. If a plant is provided with all mineral nutrients but, Mn concentration is increased, what will be the deficiency?

(a) Mn prevent the uptake of Fe, Mg but not Ca
(b) Mn increase the uptake of Fe, Mg and Ca
(c) Only increase the uptake of Ca
(d) Prevent the uptake Fe, Mg, and Ca

[Ans. (a) Mn prevent the uptake of Fe, Mg but not Ca]

3. The element which is not remobilized?

(a) Phosphorous (b) Potassium
(c) Calcium (d) Nitrogen

[Ans. (c) Calcium]

4. Match the correct combination.

	Minerals		Role
A	Molybdenum	1	Chlorophyll
B	Zinc	2	Methionine
C	Magnesium	3	Auxin
D	Sulphur	4	*Nitrogenase*

(a) A-1 B-3 C-4 D-2 (b) A- 2 B-1 C-3 D-4
(c) A-4 B-3 C-1 D-2 (d) A-4 B-2 C-1 D-3

[Ans. (c) A-4, B-3, C-1, D-2]

5. Identify the correct statement

(i) Sulphur is essential for amino acids Cystine and Methionine
(ii) Low level of N, K, S and Mo affect the cell division
(iii) Non-leguminous plant Alnus which contain bacterium *Frankia*
(iv) Denitrification carried out by nitrosomonas and nitrobacter.

(a) I, II are correct (b) I, II, III are correct
(c) I only correct (d) all are correct

[Ans. (b) I, II, III are correct]

6. The nitrogen is present in the atmosphere in huge amount but higher plants fail to utilize it. Why?

Ans. 1. Plants absorb minerals from the soil along with water with the help of Roots. Minerals are absorbed as salts.

2. Nitrogen is present in large quantities in the atmosphere in a gaseous form. The gaseous nitrogen must be fixed in the form of Nitrate salts in the soil to facilitate absorption by plants.

3. Nitrogen fixation can occur only by
   a) Non - Biological means (Industrial processes or by lightning)
   b) Biological means (Bacteria / Cyanobacteria Fungi)

Therefore higher plants cannot utilize the atmospheric Nitrogen.

7. Why is that in certain plants deficiency symptoms appear first in younger parts of the plants while in others, they do so in mature organs?

Ans. When deficiency symptoms appear first, we can notice the differences in old and younger leaves. It is mainly due to mobility of minerals. Based on this, they are classified into 1. Actively mobile minerals and 2. Relatively immobile minerals

(a) Actively mobile minerals: Nitrogen, Phosphorus, Potassium, Magnesium, Chlorine, Sodium, Zinc and Molybdenum.

Deficiency symptoms first appear on old and senescent leaves due to active movement of minerals to younger leaves.

(b) Relatively immobile minerals: Calcium, Sulphur, Iron, Boron and Copper. Here, deficiency symptoms first appear on young leaves due to the immobile nature of minerals.

8. Plant A in a nutrient medium shows whiptail disease. Plant B in a nutrient medium shows a Little leaf disease. Identify mineral deficiency of plant A and B?

Ans. **Plant A** in nutrient medium shows whiptail disease: Mineral deficiency is due to Molybdenum.

Plant B in a nutrient medium shows little leaf disease:

Mineral deficiency is due to zinc.

UNIT-V

PLANT PHYSIOLOGY
(FUNCTIONAL ORGANISATION)

Chapter 13

PHOTOSYNTHESIS

CHAPTER SNAPSHOT

3. **Assertion (A) :** **The optimum temperature for photosynthesis varies from plant to plant.**

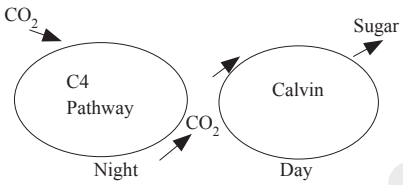
Reason (R) : **Optimum temperature for photosynthesis is 25°C to 35°C. This is not applicable for all plants. The ideal temperature for plants like *opuntia* is 55°C, Lichens 20°C and Algae 75°C.**

(a) Both (A) and (R) are wrong
(b) (A) is wrong and (R) is correct
(c) (A) is correct and (R) is wrong
(d) (A) is correct and (R) explains (A)

[Ans. (d) (A) is correct and (R) explains (A)]

VII. IDENTIFY THE CORRECT OPTIONS FOR THE PARTS OF THE DIAGRAM:

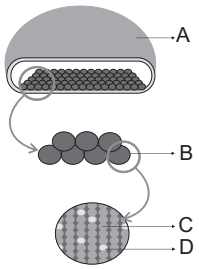
1. **The photosynthetic pathway is represented in a schematic representation. Mark the correct option.**



(a) It represents cactus plants where A occurs in the mesophyll & B in the bundle sheath cells
(b) It represents sugarcane plants where A occurs in the mesophyll & B in the bundle sheath cells
(c) It represents pineapple plants where both A & B occur in the mesophyll cells
(d) It represents maize plants where A & B are separated only temporarily

[Ans. (d) It represents maize plants where A & B are separated only temporarily]

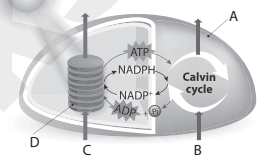
2. **Identify the parts marked as A, B, C and D for the below diagram "Quantasome".**



	A	B	C	D
(a)	Thylakoid	Antenna Molecule	Chlorophyll 'b'	Carotenoid
(b)	Antenna Molecule	Thylakoid	Chlorophyll 'b'	Carotenoid
(c)	Antenna Molecule	Chlorophyll 'b'	Carotenoid	Thylakoid
(d)	Carotenoid	Chlorophyll 'b'	Antenna Molecule	Thylakoid

[Ans. (a) A-Thylakoid, B-Antenna Molecule C-Chlorophyll 'b', D-Carotenoid]

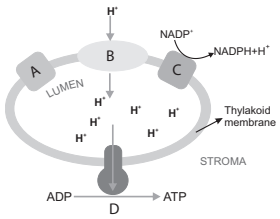
3. **Identify the parts marked as A, B, C and D for the below diagram "Light and Dark Reaction".**



	A	B	C	D
(a)	Granum	H_2O	CO_2	Chloroplast
(b)	Granum	CO_2	H_2O	Chloroplast
(c)	Chloroplast	CO_2	H_2O	Granum
(d)	Chloroplast	H_2O	CO_2	Granum

[Ans. (c) A-Chloroplast, B-CO_2 C-H_2O, D-Granum]

4. **Identify the parts marked as A, B, C and D for the below diagram "Chemiosmotic theory".**



	A	B	C	D
(a)	PS - II	Cytochromes 'b' & 'f'	PS - I	*ATP Synthase*
(b)	PS - I	Cytochromes 'b' & 'f'	PS - II	*ATP Synthase*
(c)	Cytochromes 'b' & 'f'	PS - II	PS - I	*ATP Synthase*
(d)	Cytochromes 'b' & 'f'	PS - I	PS - II	*ATP Synthase*

[Ans. (a) A - PS - II, B - Cytochromes C - PS - I, D - ATP *Synthase*]

UNIT-V

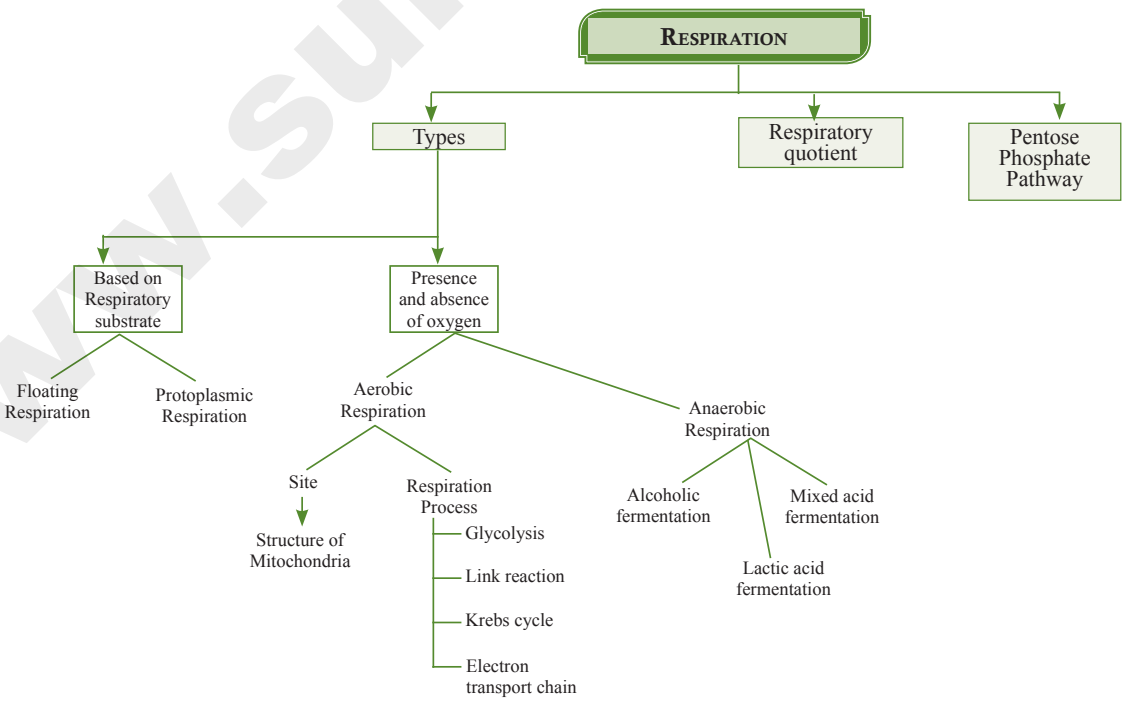
PLANT PHYSIOLOGY
(FUNCTIONAL ORGANISATION)

Chapter 14

RESPIRATION

CHAPTER SNAPSHOT

CONCEPT MAP

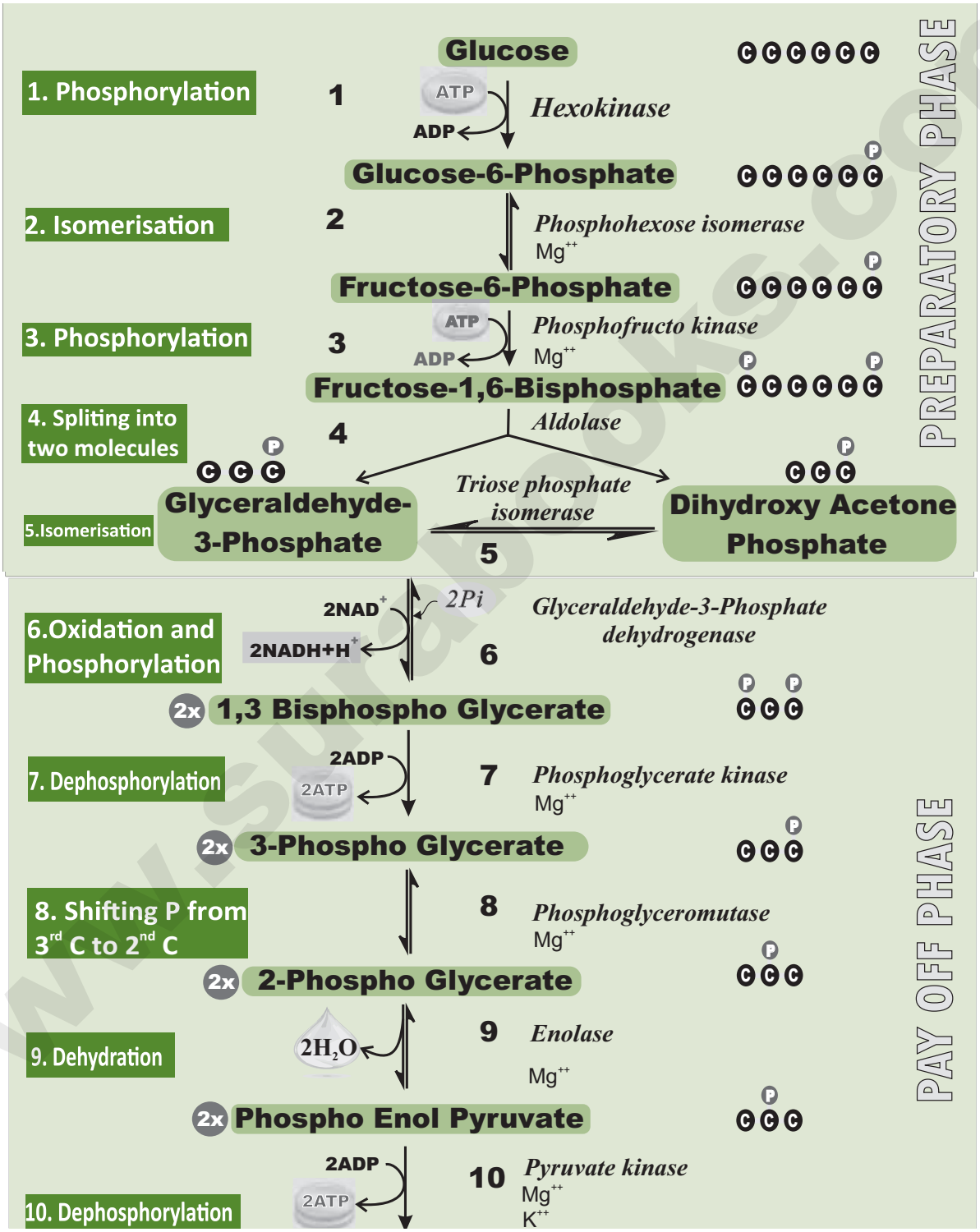


LONG ANSWERS

5 MARKS

1. Write the flow chart of Glycolysis. *[HY-2018]*

Ans. **Glycolysis / EMP Pathyway:**



UNIT-V

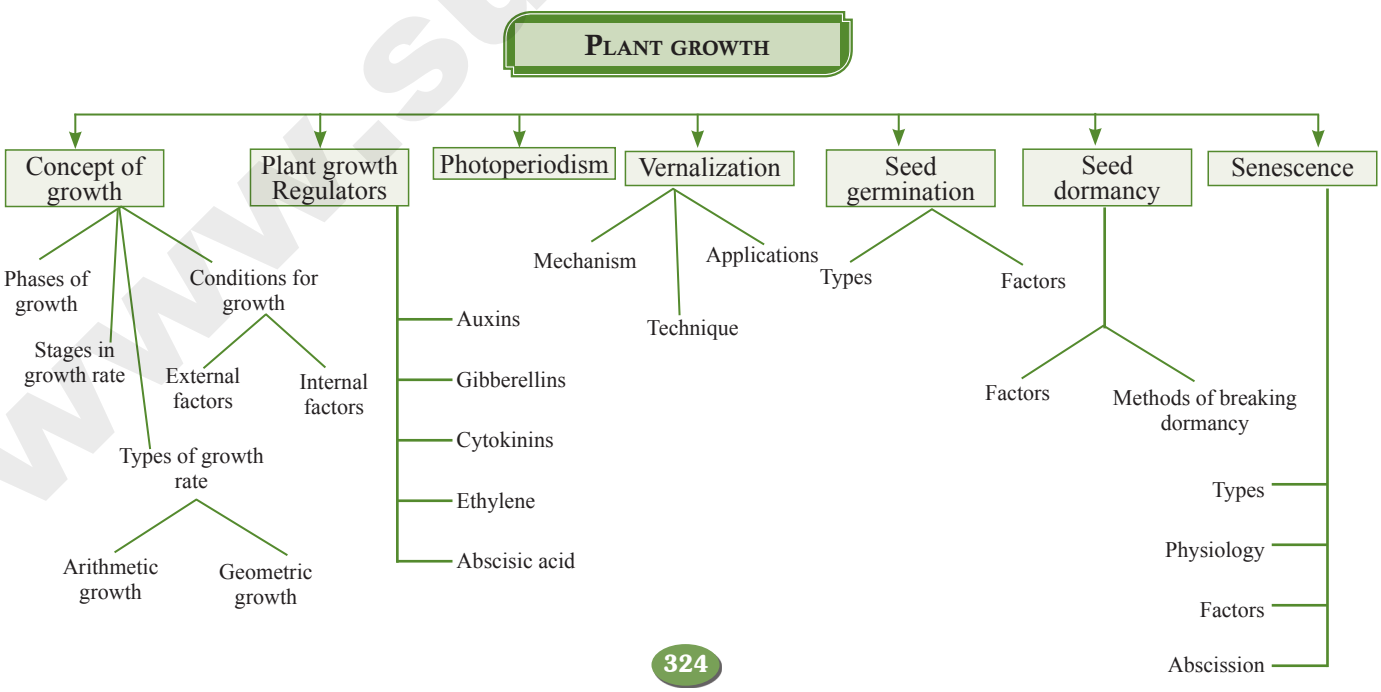
PLANT PHYSIOLOGY
(FUNCTIONAL ORGANISATION)

Chapter 15

PLANT GROWTH AND DEVELOPMENT

CHAPTER SNAPSHOT

CONCEPT MAP



Botany Long Version Questions (for pure science Group)

Long Version Evaluation

1. Refer Evaluation Q.No.1
2. Refer Evaluation Q.No.2
3. Refer Evaluation Q.No.3
4. Refer Evaluation Q.No.4
5. Refer Evaluation Q.No.5
6. Refer Evaluation Q.No.6
7. Refer Evaluation Q.No.7
8. Refer Evaluation Q.No.8
9. Refer Evaluation Q.No.9
10. **What are the physiological effects of plants facing drought condition?**

Ans. **Drought Stress:**

1. The term 'drought' denotes a period without appreciable precipitation, during which the water content of the soil is reduced to such an extent that plants suffer from water deficiency. Effects of drought are as follows:
2. Decrease in cellular growth and synthesis of cell wall components cause the cells to become smaller in size.
3. Nitrogen fixation and its reduction are decreased by decreasing the activity of certain enzymes.
4. Increase in abscisic acid level ultimately closes down the stomatal apparatus to the minimum, hence, transpiration declines.
5. Protochlorophyll formation is inhibited and photosynthetic process declines.
6. Levels of proline increases; Respiration and translocation of assimilates decreases.
7. Loss of water leads to increase in the activity of hydrolytic enzymes, followed by destruction of RNA and disruption of protein.
8. Wilting in mature leaves is associated with carbohydrate depletion due to mobilization export, followed by leaf senescence.

11. **Explain the mechanism of biotic stress.**

Ans. **Biotic Stresses:**

1. These are adverse effects on plants caused by other living organisms such as viruses, bacteria, fungi, parasites, insects, weeds and competing plants.
2. Biotic environmental stress is also caused due to the activity of man by cutting herbs and trees, twigs for fodders, fuels and agricultural purposes.
3. The biotic stresses caused by bacteria, fungi and nematodes that are ever present in the environment are called potential biotic stresses.

These are divided into two types. They are:

1. **Allelopathy:**
   - i. An organism producing one or more biochemical substances that greatly influence the germination, growth and reproduction of other organisms is called Allelopathy.
   - ii. These biochemicals are known as allelochemicals.
   - iii. They are beneficial (positive allelopathic) or detrimental (negative allelopathic).
   - iv. These allelochemicals are obtained from leaf after leaching on the ground and also from roots.
   - v. The term allelopathy is from Greek words *allelon*-each other and *pathos*-to suffer and first used in 1937 by Hans Molisch.
   - vi. Allelopathic effect may occur with weeds on crops and vice versa.
   - vii. One of the most famous allelopathic plants is Black walnut (*Juglans nigrum*).
   - viii. The chemical which is present in Black walnut is Juglone and it is a respiratory inhibitor.
   - ix. Solanaceous plants such as tomato, capsicum and eggplant are susceptible to juglone.

PUBLIC EXAM QUESTION PAPER MARCH - 2019

11th STD.

TIME ALLOWED : 1.15 Hours

BIO-BOTANY

MAXIMUM MARKS : 35

Instructions:

i. Check the question paper for fairness of printing. It there is any lack of fairness, inform the Hall Supervisor immediately.
ii. Use **Blue** or **Black** ink to write and underline and **pencil** to draw diagrams:

SECTION – I

Note : (i) Answer **all** the questions: **(8 × 1 = 8)**
(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. Vexillary aestivation is characteristic feature of _____ family.
(a) Ssolanaceae (b) Brassicaceae
(c) Fabaceae (d) Asteraceae

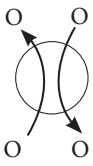
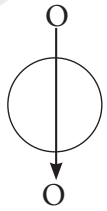
2. Match :
(1) Potassium – (i) Constituent of cell membrane, Proteins, Nucleic acids, ATP
(2) Magnesium – (ii) Essential component of Proteins, Nucleic acids, Amino acids
(3) Nitrogen – (iii) Maintains osmotic potential and turgidity of the cell
(4) Phosphorus – (iv) Constituent of chlorophyll
(a) (1)–(iii), (2)–(iv), (3)–(ii), (4)–(i)
(b) (1)–(iii), (2)–(ii), (3)–(i), (4)–(iv)
(c) (1)–(iv), (2)–(ii), (3)–(iii), (4)–(i)
(d) (1)–(i), (2)–(iv), (3)–(iii), (4)–(ii)

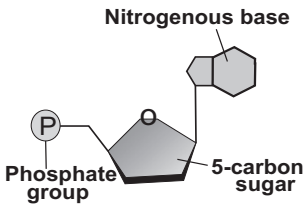
3. For every CO_2 molecule entering the C_3 cycle, the number of ATP and NADPH required is :
(a) 3 ATP + 2 NADPH
(b) 3 ATP + 3 NADPH
(c) 2 ATP + 2 NADPH
(d) 2 ATP + 3 NADPH

4. Photosynthetic roots are seen in :
(a) Vanda (b) Tinospora
(c) Cuscuta (d) Viscum

5. The pairing of Homologous chromosomes on Meiosis is known as :
(a) Disjunction (b) Synergids
(c) Bivalent (d) Synapsis

6. If the haploid number of chromosomes for an angiosperm is 14, then the number of chromosome in its endosperm would be _____.
(a) 42 (b) 28 (c) 7 (d) 14

7. Which of the following represents symport?
(a) 
(b) 
(c) 
(d) 

8. 

The above structure represents a _____.
(a) Polynucleotide (b) Amino acid
(c) Nucleoside (d) Nucleotide

SECTION - II

Answer **any four** of the following. **(4 × 2 = 8)**

9. a. What is Plectostele? Give an example.
b. Mention any one character shared by gymnosperms and angiosperms.

11th STD.

PUBLIC EXAM QUESTION PAPER MARCH - 2020
(With Answers)

TIME ALLOWED : 3.00 Hours

PART-III / BIOLOGY

MAXIMUM MARKS : 70

Instructions:

i. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

ii. Use **Blue** or **Black** ink to write and underline and **pencil** to draw diagrams.

PART - I (BIO-BOTANTY)

(Marks : 35)

SECTION – 1

Note : (i) Answer **all** the questions: **(8 × 1 = 8)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. Axillary bud is modified into thorns in:

(a) Bambusa (b) Citrus
(c) Chrysanthemum (d) Oxalis

2. The correct sequence in cell cycle is:

(a) M - G - G_2 - S (b) S - M - G_1 - G_2
(c) S - G_1 - G_2 - M (d) G_1 - S - G_2 - M

3. Read the following sentences and identify the correctly matched sentences.

(i) In exarch condition, the protoxylem lies outside of metaxylem.

(ii) In endarch condition, the protoxylem lies towards the centre.

(iii) In centrarch condition, the metaxylem lies in the middle of protoxylem.

(iv) In mesarch condition, protoxylem lies in the middle of metaxylem.

(a) (i), (ii) and (iv) only
(b) (i), (ii) and (iii) only
(c) (ii), (iii) and (iv) only
(d) All of these

4. Which of the plant group has gametophyte as a dominant phase ?

(a) Angiosperms (b) Pteridophytes
(c) Bryophytes (d) Gymnosperms

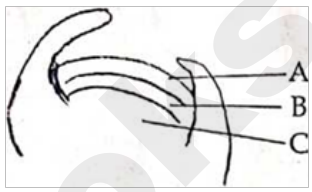
5. Protoplasm was first observed by :

(a) Hardy (b) Hugovanmohl
(c) Corti (d) Huxley

6. The element which is not remobilized:

(a) Nitrogen (b) Phosphorous
(c) Potassium (d) Calcium

7. Refer to the given figure and select the correct statement.



(i) A, B and C are histogen of shoot apex
(ii) A gives rise to medullary rays
(iii) B gives rise to cortex
(iv) C gives rise to epidermis

(a) (iii) and (iv) only (b) (i) and (ii) only
(c) (ii) and (iii) only (d) (i) and (iii) only

8. Gynoecium with united carpel is termed as :

(a) syncarpous (b) apocarpous
(c) multicarpellary (d) none of the above

SECTION - 2

Answer **any four** questions. Question No.14 is compulsory. **(4 × 2 = 8)**

9. Give any two floral characteristics of *Clitoria ternatea*.

10. What are the parameters which control water potential ?

11. What is plasticity?

12. What are the enzymes involved in phosphorylation and dephosphorylation reactions in EMP pathway ?

13. Give general account on Lichens.

14. What is plectostele ? Give an example.