



MARCH-2024 (AP)

PREVIOUS PAPERS

IPE: MARCH-2024 (AP)

Time : 3 Hours

JR.BOTANY

Max.Marks : 60

SECTION-A**I. Answer ALL the following VSAQ:****10 × 2 = 20**

1. What is flora?
2. Name two diseases caused by Mycoplasmas.
3. What are Herbalists? What are the books written by them?
4. What is meant by parthenocarpic fruit? How is it useful?
5. Differentiate between apocarpous and syncarpous ovary.
6. Give the technical description of anthers of *Allium cepa*.
7. What is osmosis?
8. What constituents of DNA are linked by glycosidic bond?
9. Which of the phases of cell cycle is longest duration?
10. Name the type of land plants that can tolerate the salinities of the sea.

SECTION-B**II. Answer any SIX of the following SAQs:****6 × 4 = 24**

11. Write the role of Fungi in our daily life.
12. Write a note on economic importance of Algae and Bryophytes.
13. Define (a) Juvenile phase (b) Reproductive phase
14. Describe the non-essential floral parts of plants belonging Fabaceae.
15. Though redundantly described as a resting phase, interphase does not really involve rest. Comment.
16. What are nucleosomes? What are they made of?
17. What is the difference between lenticels and stomata?
18. Write a brief account on classification of xerophytes.

SECTION-C**II. Answer any TWO of the following SAQs:****2 × 8 = 16**

19. Define root modification. Explain how root is modified to perform different functions.
20. Describe the process of Fertilization in angiosperms.
21. Describe the internal structure of a dicot Root.

IPE AP MARCH-2024

ANSWERS

SECTION-A

1. What is flora?

[TS M-15][APM-24]

A: **Flora** is the actual account of habitat, distribution and systematic listing of plants of a given area.

2. Name two diseases caused by Mycoplasmas.[AP M-24][AP MAY-19][TS May -17]

A: Mycoplasmas cause

- 1) '**Witches broom**' disease in **plants**.
- 2) **Pleuropneumonia** in **cattle**
- 3) **Mycoplasma urethritis** in **Humans**.

3. Who are Herbalists? What are the books written by them?

[APM-24]

- A:**
- 1) The scientists who identified and described the Medicinal plants technically are called the Herbalists.
 - 2) The books written by them are called **Herbals**.

4. What is meant by parthenocarpic fruit? How is it useful? [AP May-19][APM-17,24]

- A:**
- 1) When a fruit is formed without fertilization of ovary, it is called parthenocarpic fruit.
 - 2) It is useful in the Juice industries for commercial production of seedless fruits. **Ex:** Banana.

5. Differentiate between apocarpous and syncarpous ovary.

[AP M-18, 23, 24]

A:	Apocarpous Ovary	Syncarpous Ovary
1)	All the carpels of gynoecium present on the thalamus are free from each other	1) All the carpels of gynoecium present on the thalamus are fused with each other.
2)	Ex: Lotus, Rose.	2) Ex: Mustard, Tomato.

6. Give the technical description of anthers of *Allium cepa*. [APMAY-19] [TS M-16]

- A:** 1) In *Allium cepa*, anthers are dithecous, basifixed, introrse and dehiscence is longitudinal.
2) Bentham and Hooker, de Jussieu and de Candolle followed this system.
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7. What is Osmosis? [AP M-24]

- A:** **Osmosis:** Movement of molecules or ions or water from a region of higher concentrated place to a region of lower concentrated place through a semi permeable membrane is called osmosis. Movement of water by diffusion across the membrane is called Osmosis.
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8. What constituents of DNA are linked by glycosidic bond? [AP M-15,17,19,24]

- A:** 1) A Glycosidic bond is formed between two carbon atoms of two adjacent monosaccharides.
2) **Nitrogen base** is linked to sugar group laterally by glycosidic bond.
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9. Which of the phases of cell cycle is of longest duration? [AP May-19, 24]

- A:** 1) **Interphase** of cell cycle has **longest duration**.
2) It consists of 3 phases: **G₁ Phase, S phase, G₂ phase**.
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10. Name the type of land plants that can tolerate the salinities of the sea.

- A:** 1) Halophytes can tolerate the salinities of the sea. [APM-24] [APMAY-19]
2) **Ex:** Rhizophora.

SECTION-B

11. Write the role of Fungi in our daily life.

[IPE Mar- 14]

A: Role of Fungi in our daily life:

I) Advantages of Fungi:

- 1) Yeast is the unicellular fungus. It is used in the commercial preparation of bread and beer.
- 2) The Antibiotic 'penicillin' is obtained from a fungus called **penicillium**.
- 3) Mushrooms (Agaricus), morels and truffles are the common edible fungi.

II) Disadvantages of Fungi:

- 1) Some fungi cause diseases in plants.
- 2) **Red rot disease** on sugar cane is due to **Collectotrichum**.
- 3) **Rust disease** on wheat is due to **Puccinia**.

12. Write a note on economic importance of Algae and Bryophytes. [APM-19][TS M-16]

A: I) Economic importance of Algae:

- 1) Fixation of carbondioxide on Earth is mainly carried out by algae.
- 2) **Brown algae** produces **Algin**.
- 3) **Red algae** produces **Carrageen**.
- 4) **Agar Agar** is obtained from **Gelidium**.
- 5) **Chlorella** and **Spirulina** are used as food supplements by **space** travellers.

II) Economic importance of Bryophytes:

- 1) Mosses provide food for herbivorous mammals and birds.
- 2) Sphagnum provides peat, which is used as fuel.
- 3) They play significant role in **plant succession**.
- 4) They **prevent soil erosion**.
- 5) They are used as **packing material** for trans-shipment.

13. Define (a) Juvenile phase (b) Reproductive phase. [AP M-20, 24]

A: a) **Juvenile Phase:** All organisms have to reach a certain stage of growth and maturity in their life before they can reproduce sexually. This stage is called juvenile phase or vegetative phase.

b) **Reproductive Phase:** The phase where the plants start producing flowers is called Reproductive Phase. This is the end of the Juvenile phase.

14. Describe the non-essential floral parts of plants belonging Fabaceae. [IPE Mar- 14]

A: 1) Non-essential floral parts of Fabaceae are Calyx and Corolla. [AP M-24] [TS M-16]

2) **Calyx:** 5 Sepals, Gamosepalous (united sepals), valvate or imbricate aestivation, odd sepal anterior.

3) **Corolla:** 5 Petals, Polypetalous (petals are free), Papilionaceous consisting of a large posterior petal (Standard), two laterals (Wings); Two anterior fused petals (keels) enclosing the stamens and pistil.

4) They show vexillary or descendingly imbricate aestivation.

15. Though redundantly described as a resting phase, interphase does not really involve rest. Comment. [AP May-19, 22] [TS M-17,20,22] [AP Mar-15,16,17,19,20,23,24]

A: **Interphase:** The state of cell cycle, at which, the nucleus is not in a state of division, is called Inter phase. It is the period of preparation for cell division. This stage occurs between two successive cell divisions.

The inter phase is called resting phase. But during this time, the cell prepares for division by undergoing both cell growth and DNA replication in an orderly manner. The inter phase is divided into 3 sub stages- G_1 phase, S phase and G_2 phase.

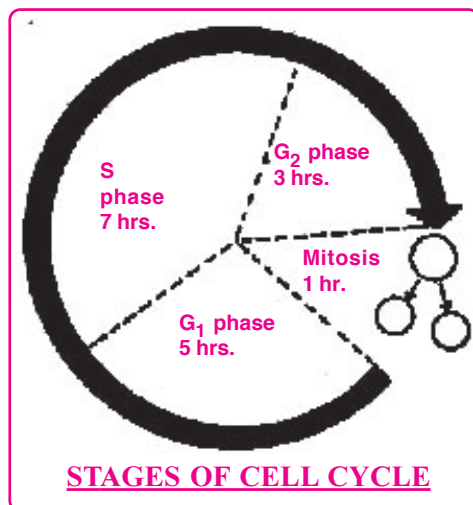
1) **G_1 phase:** This is the phase between mitosis phase and initiation of DNA replication. During **G_1 phase** the cell is **metabolically active** and it grows continuously; but **does not replicate its DNA**.

This G_1 phase includes

- Increase in the size of the cell.
- Synthesis of RNA and proteins.

2) **S Phase:** In this phase, **DNA replication takes place**. During this time the amount of **DNA per cell doubles**. However, there is no increase in the chromosome number.

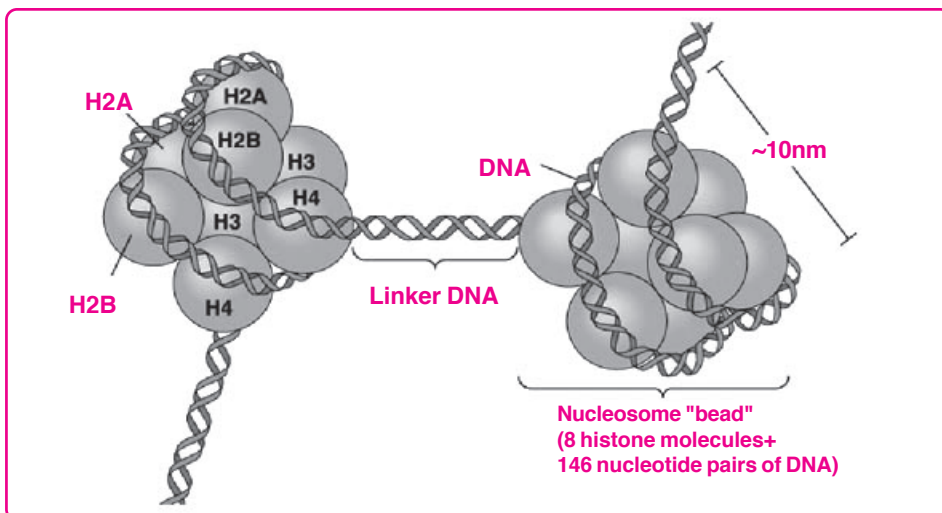
3) **G_2 phase:** During **G_2 phase**, the **synthesis of proteins and RNA continues**. Various cell organelles are newly synthesized. In view of the above 3 phases, we say interphase does not really involve rest.



16. What are nucleosomes? What are they made of? [AP, TS May-17] [AP M-16, 19]

[AP May-19]

- A:**
- 1) Nucleosome is a structural unit of eukaryotic chromosome, consisting of a length of DNA coiled around a core of histones.
 - 2) A typical nucleosome contains **200bp of DNA** double helix wrapped (Two turns) around a core of histone octamer through a linear histone protein - H_1 .
 - 3) It has two copies of each of four types of histone proteins viz., H_2A , H_2B , H_3 and H_4 .



NUCLEOSOME MODEL

17. What is the difference between lenticels and stomata? [TS 17] [AP 17, 23,24]

A:	Lenticels	Stomata
<ol style="list-style-type: none"> 1) Lenticels are the aerating pores present on old stems and old aerial roots. 2) They contain closely arranged parenchymatous cells. 3) Lenticels are meant for the exchange of gases between the outer atmosphere and the internal tissues of woody organs. 4) Opening and closing mechanisms are absent in lenticels. 5) Lenticels do not conduct photosynthesis. 	<ol style="list-style-type: none"> 1) Stomata are present on leaves and young stems. 2) Each stomata is guarded by two guard cells which contain chloroplasts. 3) Stomata help in transpiration and respiration of plants. 4) Opening and closing mechanisms are present in stomata. 5) Guard cells conduct photosynthesis. 	

18. Write a brief account on classification of xerophytes. [AP Mar -17,20,24][TS M-16,22]

A: Xerophytes: The plants which grow in habitats deficient of water supply are called xerophytes. They are classified into three categories.

1) Ephemerals:

- i) These plants are annuals, mostly found in arid (dry) zones.
- ii) They complete their life cycle with in a very short period. **Ex:** Tribulus.

2) Succulents:

- i) These plants absorb large quantities of water during rainy season.
- ii) They store the water in different parts of the plant in the form of mucilage.
- iii) As a result, the plant parts like the stem (**Ex:** Opuntia), leaf (**Ex:** Aloe), root (**Ex:** Asparagus) become succulent.
- iv) The stored water is used during dry periods.
- v) These are called '**drought avoiding plants**'.

3) Non-Succulents:

- i) These are perennial plants which can withstand prolonged periods of drought.
Ex: Casuarina, Nerium.
- ii) These are called '**true xerophytes**'.

SECTION-C

19. Define root modification. Explain how root is modified to perform different functions.
[TS 20,23] [AP May-19][AP, TS M-15,17]

A: Root: The under ground part of the flowering plant is called root.

Roots are of two types: (i) Tap Roots (ii) Fibrous Roots

Root modification: Roots in some plants change their shape and structure to perform some additional functions **other than absorption and conduction.**

Such modification of roots is called Root Modification.

Types of Root modifications and their Functions:

1) Storage roots:

- i) Roots of some plants **store food material.**
- ii) Due to this, the roots become swollen.

Ex: Tap roots in carrot; Adventitious roots in sweet potato;

Fibrous roots in Asparagus.

😊 Wow! Your favourite **Carrot**, Banyan, **Sugar Cane**, Avicennia are all root modifications

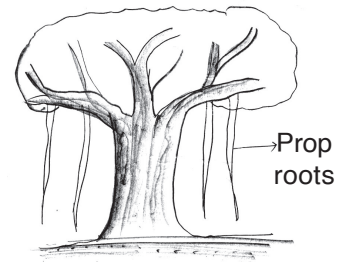


Carrot

2) Proproots :

- i) Roots of some trees arise from heavy branches.
- ii) They hang in air and enter into soil.
- iii) They give **pillar like support** to the heavy branches.

Ex: Banyan Tree

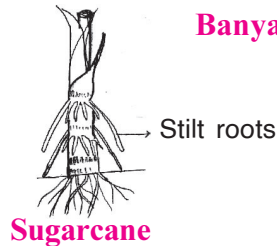


Banyan Tree

3) Stilt roots:

- i) Roots of some plants arise from the lower nodes of the stem.
- ii) They give **mechanical support** to the plant.

Ex: Sugarcane and maize

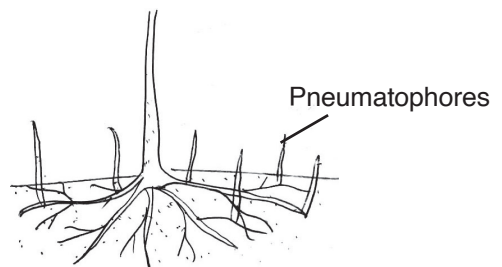


Sugarcane

4) Respiratory roots(Pneumatophores):

- i) Roots of some plants grow in swampy area.
- ii) They grow vertically upwards into the air.
- iii) Their openings on their surfaces help to **get oxygen for respiration.**

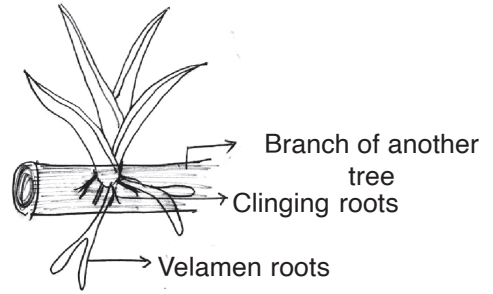
Ex: Avicennia and Rhizophora



5) Velamen roots:

- i) Roots of some plants are found on the branches of some other plants (epiphytes).
- ii) The function of these adventitious roots is to **absorb moisture from atmosphere.**

Ex: Vanda.

**6) Parasite roots(or) Haustorial roots :**

- i) The plants that depend upon some other plants

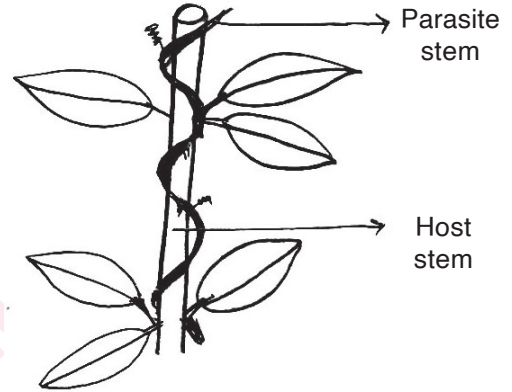
for their **food and water** are called parasite plants.

- ii) They are two types.

a) Complete parasites

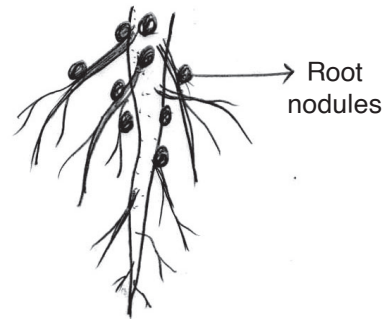
Ex: Cuscuta, Rafflesia

b) Partial parasites: Ex: Viscum, Striga.

**7) Nodular roots:**

- i) Roots having nodules are called nodular roots.
- ii) These are present in the members of Fabaceae.
- iii) Rhizobium bacteria live in the root nodules and they **fix atmospheric nitrogen.**

- iv) **Ex: Ground Nut**

**8) Photosynthetic roots:**

- i) Roots of some plants become chlorophyllous (green)
- ii) In these plants, normal, green leaves are reduced.
- iii) They perform **photosynthesis.**
- iv) **Ex: Taeniophyllum.**



Taeniophyllum

20. Describe the process of Fertilization in angiosperms. [TS 22][AP, TS M-15]

A: Fertilization in angiosperms: The fusion of male and female gametes is called Fertilization. The process of fertilization in angiosperms consists of five steps.

1) Entry of the pollen tube into ovule:

The pollen tube enters the ovule by any one of 3 ways.

i) **Porogamy:** Entry of the pollen tube **through Micropyle** is Porogamy. **Ex: Hibiscus**

ii) **Chalazogamy:** Entry of the pollen tube **through Chalaza** is Chalazogamy. **Ex: Casuarina**

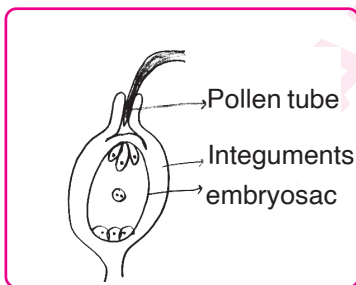
iii) **Mesogamy:** Entry of the pollen tube **through Integuments** is Mesogamy. **Ex: Cucurbita**

2) **Entry of pollen tube into embryo sac:** During the entry of the pollen tube into the embryo sac, the filiform apparatus of synergids guide the pollen tube.

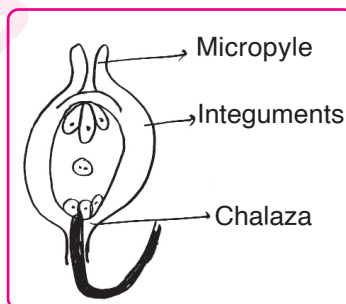
3) **Discharge of male gametes into Embryosac:** The pollen tube always enters the embryosac at the micropylar end of embryosac. After entering one of the synergids, the pollentube bursts and releases two male gametes into the cytoplasm of the synergids.

4) **Syngamy:** One of the male gametes fuses with the egg cell, resulting in the formation of diploid zygote. This is called syngamy or true fertilisation

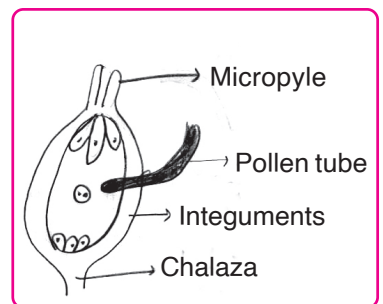
5) **Triple fusion and double fertilisation:** The second male gamete fuses with the diploid secondary nucleus and results in the formation of a triploid Primary Endosperm Nucleus (PEN). This phenomenon is also known as double fertilisation. As this process involves the fusion of one nuclei of 'haploid male gamete' and two polar nuclei, this fusion is also known as triple fusion.



POROGAMY



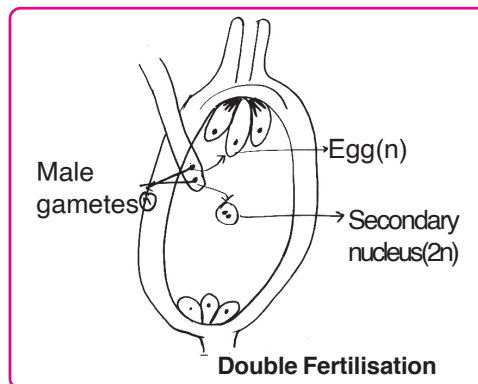
CHALAZOGAMY



MESOGAMY

Tick

Boxes



Double Fertilisation

😊 BULLET HINT 😊

PMH

CC

MIC

21. Describe the internal structure of a Dicot Root.

[TS M-22[AP May-19,22]

A: T.S of Dicot Root shows three main parts. They are I) Epidermis II) Cortex III) Stele

I) Epidermis:

[AP 23]

- 1) It is the outermost layer
- 2) It is made up of single layered rectangular cells.
- 3) It contains root hairs. They help in absorption of water.
- 4) Cuticle and stomata are absent.
- 5) Epidermis is useful in the protection of inner tissue.

II) Cortex: The Region between epidermis and stele is called cortex. It has three subparts.

1) Exodermis:

- i) It is 2 to 3 layered thick suberised cells.
- ii) It prevents the exit of water from cortex.

2) Parenchyma (General Cortex):

- i) It is found below the hypodermis and is made up of thin walled parenchyma.
- ii) They enclose a number of glands.

3) Endodermis:

- i) It is the inner most layer of the cortex.
- ii) Cylindrical cells are tightly arranged.
- iii) Endodermis contains 'casparian thickenings' deposited with suberin in cell wall.

III) Stele: Stele is the central conducting cylinder.

It has three parts (1) Pericycle (2) Vascular bundles (3) Medulla

1) Pericycle:

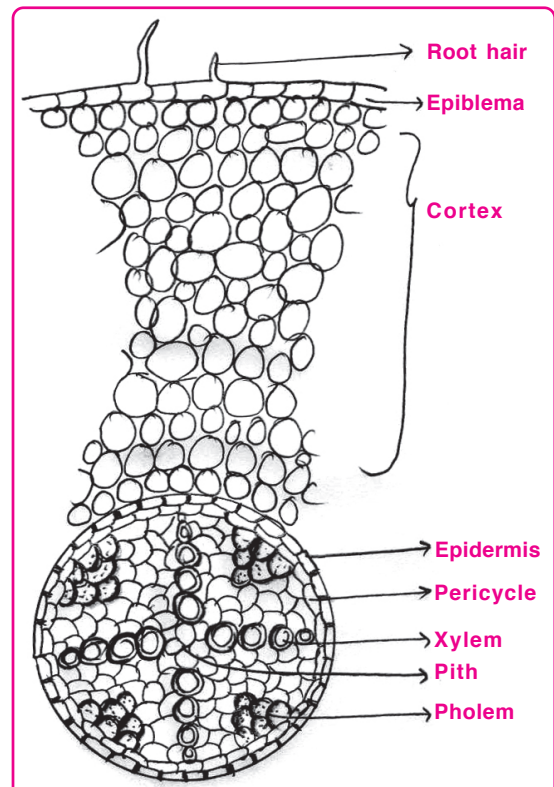
- i) Pericycle is with single layer of cells surrounding the stele.
- ii)* **Secondary growth is observed.**

2) Vascular bundles:

- i) Vascular bundles contain xylem and phloem on separate radii.
- ii)* **Usually 4 xylem bundles alternate with 4 phloem bundles.**
- iii)* This condition is called '**Tetrach**'.
- iv) Xylem transports water.
Phloem transports food.

3) Medulla (or) Pith :

- i)* Medulla is small (or) **absent**.
- ii) It helps in the storage of food and water.

**TS OF DICOT ROOT**