

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1004 C

Unique Paper Code : 32161501

Name of the Paper : Reproductive Biology of Angiosperms

Name of the Course : B. Sc. (Hons.) Botany

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates **Deshbandhu College Library**
Kalkaji, New Delhi-19

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all including Question Number 1 which is compulsory.
3. All parts of a question must be answered together.
4. All questions carry equal marks.
5. Draw well-labelled diagrams and write the botanical name wherever necessary.

P.T.O.

1. (a) State whether the following statements are true or false. (1×5=5)

(i) Tapetum forms the outermost anther wall layers that surround the sporogenous tissue.

(ii) Monosporic embryo sac is 7 celled and 8 nucleate structure.

(iii) Cheiropterophily is the pollination by insects.

(iv) S.G Nawaschin discovered the double fertilization.

(v) G.B. Amici has been given the credit of revealing the role of pollen in fertilization.

(b) Fill in the blanks

(1×5=5)

- (i) Pollination that takes place with the help of beetles is called _____
- (ii) The expulsion of seed brought about by the turgidity is called _____
- (iii) The persistent nucellus is called _____
- (iv) _____ demonstrated the possibility of raising large numbers of haploids from pollen grains of *Datura innoxia*.
- (v) The megasporangium together with integuments is called _____

(c) Match the following: (0.50×10=5)

Column A	Column B
(a) <i>J. Heslop-Harrison</i>	(i) Ultrastructure of egg apparatus
(b) <i>Sasa paniculata</i>	(ii) Five Types of microspore tetrads
(c) <i>Aristolochia elegans</i>	(iii) Highest number of antipodals
(d) <i>Quinchamalium chilense</i>	(iv) Pollen wall proteins
(e) <i>Ophrys speculum</i>	(v) Endothelial thickenings
(f) α -cellulose	(vi) Pollen viability
(g) 2,3,5 triphenyl tetrazolium chloride	(vii) Finger like projections in egg cell
(h) <i>Plumbago zeylanica</i>	(viii) Pseudocopulation
(i) <i>Fritillaria</i>	(ix) Synergid and antipodal haustoria both present
(j) <i>W.A. Jensen</i>	(x) Bambacioni effect

2. Write short note on any five of the following:

(3×5=15)

(i) Importance of synergids

(ii) Parthenocarpy

(iii) Integumentary tapetum

(iv) Hellobial endosperm

(v) Nemec phenomenon

(vi) Pollen Wall

3. Differentiate between (any five)

(3×5=15)

(i) Wet stigma and dry stigma

(ii) Composite and Ruminant endosperm

(iii) Egg cell and Synergids

(iv) 2-celled and 3-celled pollens

(v) Simultaneous and successive wall formation

(vi) Endothelium and endothecium

4. Briefly explain the following:

(a) Give the biological significance of seed dispersal phenomena. (5)

(b) List the various causes of polyembryony and explain any two types. (5)

(c) List five types of embryogeny and explain the Onagrad type. (5)

5. Answer the following

(a) Write briefly on transformation of egg cell through pollen tube pathway method. (5)

(b) Role of tapetum in pollen development. (5)

- (c) Elaborate on the importance of apomixis in crop improvement. (5)
6. (a) Describe the structure of mature Polygonum type of embryo sac with the help of labeled diagram. (5)
- (b) Define self-incompatibility among plants and discuss the factors which are involved in establishing it, List any five methods which can overcome self-incompatibility among flowering plants and describe any one of them. (5)
- (c) Discuss with diagrams any two methods of floral mechanisms that favor cross pollination. (5)
7. (a) Draw well-labelled diagram of the following:
(2×2.5=5)
- (i) L.S. of anatropous, bitegmic, crassinucellate ovule showing Oenothera type of embryo sac

(ii) T.S. of a tetrasporangiate anther showing pollen tetrad stage

(b) "Endosperm provides nutrition to embryo".

Elaborate the statement with suitable examples.

(5)

(c) Comment on Male Germ Unit and its structure

with examples.

(5)

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Your Roll No.....

Sr. No. of Question Paper : 1040

C

Unique Paper Code : 32161502

Name of the Paper : Plant Physiology

Name of the Course : B.Sc. (H) Botany Part III

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates **Deshbandhu College Library**
Kalkaji, New Delhi-19

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five questions** in all. Answer all parts of a question together.
3. **Question Number 1** is compulsory.
4. Draw well-labeled diagrams wherever necessary.

P.T.O.

1. (a) Match the following:

(i) Jasmonate

(a) Secondary metabolite

(ii) Zeatin

(b) Chelating agent

(iii) Antiauxin

(c) ABA

(iv) Antitranspirant

(d) TIBA

(v) EDTA

(e) Cytokinin

(1×5=5)

(b) Give one word for the following:

(i) The technique of growing plants in aqueous
(nutrient) culture-

(ii) Pulling away of plasma membrane from the cell wall in a hypertonic solution-

(iii) Yellowing of leaves due to lack of chlorophyll-

(iv) Channels in the cell membrane for the passage of water-

(v) A gaseous hormone- (1×5=5)

(c) Give reasons for the following:

(i) Addition of solute in water decreases its water potential.

(ii) Germination in lettuce seed is promoted by red light.

- (iii) Some seeds germinate only when they pass through the gut of an animal.
- (iv) Removal of growing apex from the main axis results in faster growth of lateral branches.
- (v) Leaf discs incubated in cytokinin solution remain green. (1×5=5)
2. (a) What is photoperiodism? How are plants classified on the basis of their photoperiodic responses? (5)
- (b) Transpiration is a necessary evil. Comment. (5)
- (c) Discuss the mechanism of stomatal opening and closing with a suitable diagram. (5)

3. Write short notes on the following (Any three)

(i) Brassinosteroids

(ii) Mycorrhizae

(iii) Commercial applications of auxins

(iv) Vernalization

(v) Root pressure (5×3=15)

4. Differentiate between the following (Any five)

(i) Antiport and symport

(ii) Low fluence response (LFRs) and High irradiance responses (HIR)

(iii) Transpiration and guttation

(iv) Active absorption and passive absorption

(v) Macro and micronutrients

(vi) Simple and facilitated diffusion (5×3=15)

5. (a) Define the different component of water potential and how are these correlated. (5)

(b) Critically comment on the role of phytohormones in any two of the following:

(i) Apical dominance

(ii) Bolting

(iii) Abscission

(5)

(c) Discuss the discovery and the physiological role of Abscisic acid. (5)

6. (a) Explain the CO-FT model of flowering with suitable diagram. (5)

(b) Describe the criteria of essentiality of an element. (5)

(c) How does water form a continuous column from the root to the tree canopy? What happens if the column breaks? (5)

7. (a) Discuss the role of Gibberellic Acid in inducing seed germination in cereals. (5)

(b) How does long-distance translocation in phloem take place? Explain. (5)

(c) What are phytosiderophores? Discuss their role in nutrient uptake. (5)

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Your Roll No.....

Sr. No. of Question Paper : 1091

C

Unique Paper Code : 32167503

Name of the Paper : Analytical Techniques in
Plant Sciences

Name of the Course : B.Sc. (Hons) Botany

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates **Deshbandhu College Library**
Kalkaji, New Delhi-1

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all, including Question 1 which is compulsory
3. Attempt all parts of a question together

P.T.O.

1. (a) Fill in the blanks (any five) (1×5=5)

(i) The pore size can be regulated by increasing or decreasing the concentration of _____ in AGE.

(ii) _____ is the commonly used material as stationary phase in thin layer chromatography.

(iii) The marker enzyme for mitochondria is _____

(iv) The magnification of a microscope having 4X ocular lens and a 40X objective lens would be _____X.

(v) Osmium tetroxide is used in electron microscopy as a _____

(vi) DNA molecules are immobilized on a _____ in Southern blotting technique.

(b) Expand (any five)

(1×5=5)

(i) SDS-PAGE

(ii) EtBr

(iii) HPLC

(iv) RCF

(v) TEM

(vi) ELISA

(c) Name the technique used for the following (any five)

(1×5=5)

- (i) To isolate chloroplast from the spinach leaves.
- (ii) To separate monosaccharide sugars with different carbon numbers from the mixture.
- (iii) To detect the presence of specific protein in a cell.
- (iv) To determine the 3-D structure of proteins.
- (v) To confirm the presence of a specific DNA sequence.
- (vi) To examine the detailed surface topography of microscopic specimens.

2. Write short notes on the following (any three):

(5×3=15)

(i) Density-gradient centrifugation

(ii) X-ray crystallography

(iii) Ion exchange chromatography

(iv) Autoradiography

3. Differentiate between the following (any five):

(3×5=15)

(i) Chromosome banding and painting

(ii) Northern and Southern blotting

(iii) Positive and Negative staining

(iv) Thin layer chromatography and Column chromatography

(v) Sucrose and Caesium chloride gradient chromatography

(vi) Light and Electron microscopy

4. Explain the following along with its applications in biological sciences (**any three**) (5×3=15)

(i) FISH

(ii) Agarose gel electrophoresis

(iii) FACS

(iv) UV-Visible Spectrophotometer

5. (i) Explain the principal and application of molecular sieve and affinity chromatography? (8)

(ii) What is "resolution". Describe different factors that influence the resolution and resolving power of a microscope. (7)

6. (i) Name five radioactive elements used in biological research along with their applications. (5)

(ii) Explain the following briefly (2.5×4=10)

(a) Role of APS and TEMED in PAGE.

(b) Why vacuum is required in electron microscopy but not in light microscopy?

(c) Role of monochromator in spectrophotometer.

(d) What is the significance of positioning of metal emitting electrode at an angle to the specimen in shadow casting?

7. Describe the following techniques and their applications (any three) (3×5=15)

(i) Sample preparation in electron microscopy

(ii) Mass spectrometry

(iii) Analytical centrifugation

(iv) Western blotting