[This question paper contains 4 printed pages.]

19 **Your Roll No.** 2024

Sr. No. of Question Paper : 4323 **G**

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

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.

1. (a) Give contributions of **any five** of the following : (1×5=5)

(i) P. Maheshwari

(ii) G.B. Amici

(iii) E. Strasburger

P.T.O.

(iv) H.Y. Mohan Ram

(v) S.G. Nawaschin

(vi) J. Heslop-Harrison

(b) Define **any five** of the following : (1×5=5)

(i) Polyspory

(ii) FGU

(iii) Double fertilization

(iv) Caruncle

(v) Pollinia

(vi) Parasexual hybrization

(vii) NPC system

(c) Give a genus family name for **any five** in which any of the following feature is present- (1×5=5)

(i) Pseudoembryosac

(ii) Pseudomonads

(iii) Egg cell having filiform apparatus

(iv) Circinotropous ovule

(v) Némec phenomenon

(vi) Occurrence of all five types of microspore tetrads

(vii) Persistent nucellus

(viii) Nucellar beak

2. Write short note on **any five** of the following : (3×5=15)

(i) Obturator

(ii) Pollen wall proteins

(iii) Cleavage polyembryony

(iv) Hellobial endosperm

(v) Adventive embryony

(vi) MGU

3. Differentiate between **any five** : (5×3=15)

(i) Endothelium and endothecium

(ii) Bisporic and tetrasporic embryosac development

(iii) Tenuinucellate ovule and crassinucellate ovule

(iv) GSI and SSI

(v) Nuclear and cellular endosperm

(vi) Hollow style and solid style

(vii) Hyphydrophily and ephydrophily

4. (a) Briefly explain the importance of callose in microsprogenesis. (5)

(b) Briefly explain *Polygonum* type of embryosac development in angiosperms. (5)

(c) Describe any two methods to overcome self-incompatibility in plants. (5)

5. (a) Briefly discuss the various means of seed dissemination with examples. (5)

(b) Describe various types of suspensor haustoria in angiosperms. (5)

(c) Elaborate on the importance of apomixis in crop improvement. (5)

6. (a) Describe in detail any two methods to test pollen viability. (5)

(b) Explain the types of embryogeny in angiosperms. (5)

(c) Briefly explain any two types of germline transformation methods. (5)

7. (a) Discuss the role of synergids during fertilization in angiosperms. (5)

(b) Draw well-labelled diagram of the following : (2×2.5=5)

(i) L.S. of orthotropous, bitegmic, crassinucellate ovule showing *Polygonum* type of embryo sac

(ii) T.S. young tetrasporangiate anther showing sporogenous tissue

(c) Enlist key characters of anemophilous and entomophilous flowers. (5)

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(20) **Your Roll No.** 2024

Sr. No. of Question Paper : 4377 **G**

Unique Paper Code : 32161502

Name of the Paper : Plant Physiology

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

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

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.

1. (a) Name the hormone **(attempt any five)**

   (i) A natural auxin

   (ii) A natural cytokinin

   (iii) A steroidal hormone

   (iv) A hormone that acts as an anti-transpirant

   (v) A hormone that induces internodal elongation

P.T.O.

(vi) A hormone that induces parthenocarpy

(1×5=5)

(b) Explain the following :

(i) A continuous transpirational stream is created in plants.

(ii) The deficiency symptoms of an immobile element are seen earlier in younger leaves.

(iii) Water potential of fully turgid cell is zero.

(iv) Reducing sugars are not translocated in the phloem.

(v) The apoplastic pathway is not available for water to cross the endodermis. (1×5=5)

(c) Give one word for the following :

(i) A nutrient that acts as secondary messenger in the cell-

(ii) Pigment responsible for the perception of blue light-

(iii) A technique used for determining phloem sap composition-

(iv) Seeds whose germination is affected by light-

(v) Suppression of growth of lateral buds-

(1×5=5)

2. (a) With suitable illustrations differentiate between different pathways of short-distance transport of water in plants. (5)

(b) Give one contribution of the following scientists :

(i) H.A. Borthwick and S.B. Hendricks

(ii) M. Chailakhyan

(iii) P. Agre

(iv) J. Levitt

(v) H.H. Dixon and J. Jolly (1×5=5)

(c) Define seed dormancy. How is it induced? Discuss its significance. (5)

3. Write short notes on the following **(attempt any three)** :

(i) Role of Jasmonates

(ii) Phytosiderophores

(iii) Apical dominance

(iv) Criteria of essentiality

(v) Vernalization (5×3=15)

4. Differentiate between the following **(attempt any five)** :

(i) Loading and unloading of phloem

(ii) Low fluence responses (LFRs) and high irradiance responses (HIRs)

(iii) Pr and Pfr

(iv) Diffusion and Osmosis

(v) Macro and micronutrients

(vi) Xylem and phloem transport (3×5=15)

5. (a) Describe in brief the factors affecting transpiration. (5)

(b) With the help of suitable illustrations explain the passive transport of ions across membranes. (5)

(c) Discuss different types of hydroponic systems and their merits. (5)

6. (a) Define bioassay and its significance? Describe one bioassay of ethylene. (5)

(b) Comment on the role and deficiency symptoms of **any two** of the following minerals :

(i) Phosphorous

(ii) Nitrogen

(iii) Iron (5×2=10)

7. (a) Discuss the experiment which led to the discovery of phytochrome. How does phytochrome regulate photomorphogenesis? (5)

(b) With the help of suitable diagrams explain the transport of water by cohesion-tension theory. (5)

(c) With suitable illustration/s explain ABC model of flowering. (5)

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Your Roll No. 2024

Sr. No. of Question Paper : 4428

G

Unique Paper Code : 32167503

Name of the Paper : Analytical Techniques in Plant Sciences

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

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

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.

1. (i) Define **(any five)** : (1×5=5)

   (a) R_f

   (b) Fluorochromes

   (c) Half–Life

   (d) Magnification

   (e) Chromosome painting

P.T.O.

(f) Cryofixation

(g) Blotting technique

(ii) Match the columns : (1×5=5)

(a) Albert Claude	(i) Confocal Microscopy
(b) James Alwine	(ii) Chromatography
(c) Henri Becquerel	(iii) Northern Blotting
(d) Marvin Minsky	(iv) Autoradiography
(e) Tswett	(v) Centrifugation

(iii) Expand **(any five)** : (1×5=5)

(a) CBB

(b) GFP

(c) RPM

(d) FACS

(e) MALDI

(f) ELISA

2. With the help of labelled illustrations only explain the steps of **(any three)** : (5×3=15)

(i) Southern Hybridization

(ii) Polyacrylamide Gel Electrophoresis

(iii) Ion Exchange Chromatography

(iv) FISH

3. Differentiate between the following **(any three)** : (5×3=15)

(i) Scanning, and Transmission Electron microscopy

(ii) HPLC and GLC

(iii) Paper, and, Thin layer Chromatography

(iv) Freeze-fracture, and, Freeze-etching

4. Write short notes on **any three** of the following : (5×3=15)

(i) Shadow Casting

(ii) Affinity Chromatography

(iii) Applications of Radioisotopes in research

(iv) Marker Enzymes

5. Describe the principle and applications of the following techniques **(any three)** : (5×3=15)

(i) X-Ray Diffraction

(ii) Column Chromatography

(iii) Ultracentrifugation

(iv) Confocal Microscopy

6. (i) Give brief answers to the following. Attempt **any five** : (2×5=10)

(a) What is the difference between resolution and magnification? What would be the

effect on resolution if numerical aperture of lens is increased or decreased.

(b) Why ultracentrifuges are refrigerated and heavily armored.

(c) Why are fixatives used during sample preparation in microscopy?

(d) The "Temperature, pH and osmotic potential of the medium are important during homogenization of the tissue." Justify the statement.

(e) TLC is advantageous over paper chromatography. Why?

(f) DNA moves towards the positive electrode in AGE. Why?

(ii) Using appropriate illustrations explain the working of Flow Cytometry. (5)

7 (i) Discuss briefly the principle of centrifugation, and describe the procedures in the differential centrifugation technique for isolating subcellular particles. (5)

(ii) Elaborate the principles of pulse-chase experiment with suitable example. (5)

(iii) Explain the principle of spectrophotometer using Beer-Lamberts Law. (5)