

[This question paper contains 6 printed pages.]

(11)

Your Roll No.

2019

Sr. No. of Question Paper : 7386

Unique Paper Code : 32161501

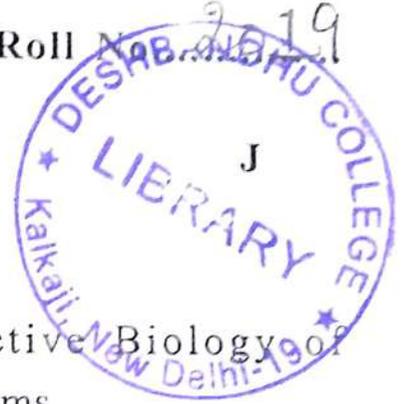
Name of the Paper : Reproductive Biology of Angiosperms

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 No. 1, which is compulsory.
3. All parts of a question must be attempted together.
4. Draw well-labelled diagrams wherever necessary.

1. (a) Fill in the blanks (**any six**) : (6×1=6)

(i) Rejection reaction occurs at the stigma surface in _____ self-incompatibility.

P.T.O.

- (ii) Pseudo-embryo sac is a characteristic feature of the family _____ .
- (iii) _____ is a fleshy outgrowth of the integument at the micropylar region of the seed which helps in dispersal and germination.
- (iv) Coconut milk is an example of _____ .
- (v) The presence of composite endosperm is a characteristic feature of the family _____ .
- (vi) The contents of the pollen tube are discharged in _____ cell of the embryo sac.
- (vii) Hypodermal position of megaspore mother cell is characteristic of _____ ovules.

(b) Define **any six** of the following terms :
(6×1=6)

- (i) Cleistogamy
- (ii) Hypostase
- (iii) Palynology

- (iv) Cybrids
- (v) Aril
- (vi) Nemeo Phenomenon
- (vii) Diplospory
- (viii) Helobial Endosperm

(c) Write the contributions of the following embryologists (**any two**) :
(2×1.5=3)

- (i) G.B. Amici
- (ii) E. Strasburger
- (iii) B. M. Johri

2. Differentiate between **any five** of the following :
(5×3=15)

- (i) Anemophily and Hydrophily
- (ii) Simultaneous and Successive Cytokinesis
- (iii) Vegetative and Generative cell
- (iv) Autochory and Anemochory

(v) Gametophytic and Sporophytic Self-Incompatibility

(vi) Endothecium and Endothelium

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

(i) Bisporic Embryo sac development

(ii) Germ line transformation

(iii) Embryogenesis in *Paeonia*

(iv) Pollen wall structure

4. Answer the following (**any three**): (3×5=15)

(a) What are the different methods used to overcome incompatibility? Explain any two methods in detail.

(b) Describe the floral mechanisms favouring cross-pollination in bisexual flowers.

(c) What are the various methods used for pollen storage? Briefly outline the practical applications of the technique of pollen storage.

(d) Explain the development of *Plumbago* type of embryo sac diagrammatically and mention the ploidy of primary endosperm nucleus.

5. Attempt **any three**: (3×5=15)

(a) Define apomixis. What is the difference between apospory and adventive embryony?

(b) Write briefly about the functions of the anther tapetum.

(c) Explain the structure and the role played by the synergids in double fertilization.

(d) What is unique about the microsporogenesis in Cyperaceae?

6. Answer the following (**any three**): (3×5=15)

(a) What are the different pathways taken by the pollen tube to enter the ovule?

(b) Explain the different factors affecting the germination of pollen grains.

(c) What is the difference between cleavage polyembryony and adventive polyembryony?

(d) Draw well-labelled diagrams of :

(i) Male Germ Unit of *Plumbago zeylanica*.

(ii) T.S. tetrasporangiate anther showing secretory tapetum and microspore tetrads.

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Your Roll No. 2019

Sr. No. of Question Paper : 7387

Unique Paper Code : 32161502

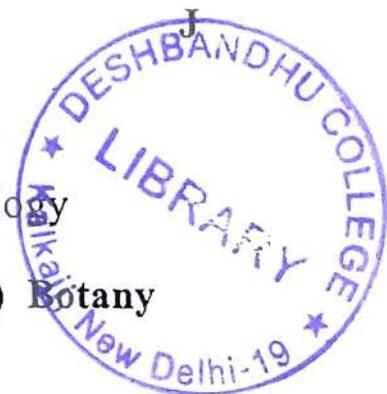
Name of the Paper : Plant Physiology

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
3. Question No. **1** is compulsory.
4. Draw well-labelled diagrams wherever necessary.

1. (a) Give the term used for the following. Attempt any five. (5x1=5)

(i) The transport mechanism in which two different solutes are moved across the membrane simultaneously.

(ii) The loss of water in the form of vapours from the aerial parts of the plant.

P.T.O.

- (iii) The requirement of cold temperature for flowering.
- (iv) Dark-grown seedlings.
- (v) The continuous system of plant cell protoplasts interconnected by plasmodesmata.
- (vi) Gas bubble formation in the xylem.

(b) Write True or False against the following. Attempt any five. (5x1=5)

- (i) The dissolved solutes in a cell contribute to the osmotic potential of the cell.
- (ii) Magnesium is a micronutrient required by plants.
- (iii) Gibberellins bring about bolting in rosette plants.
- (iv) Channels require ATP to transport solutes across membranes.
- (v) Brassinosteroids are recently discovered plant hormones.

- (vi) Sucrose is the most abundant sugar in the phloem.

(c) Fill in the blanks. Attempt any five. (5x1=5)

- (i) is the fruit ripening hormone.
- (ii) The water potential of pure water is..... .
- (iii) The hard seed coat can be rendered permeable to water and oxygen by.....
- (iv) is referred to as the rooting hormone.
- (v) The concept of forigen was put forth by..... .
- (vi) Cytokinins delay

2. Write short notes on **any three** of the following. (3x5=15)

- (i) Root pressure
- (ii) Cholodny-Went Hypothesis
- (iii) Phloem loading
- (iv) Role of ABA during embryogenesis

3. Differentiate between the following. Attempt **any three**. (3x5=15)

(i) Passive transport and active transport

(ii) Long-day plants and day-neutral plants

(iii) Hydroponics and aeroponics

(iv) Macronutrients and micronutrients

4. Attempt **any three** of the following : (3x5=15)

(i) Discuss the mechanism of action of auxins.

(ii) Write an account on phytochrome and its significance.

(iii) Explain the effects of any two factors on transpiration.

(iv) Describe the Avena coleoptile curvature bioassay for auxins.

5. Answer **any three** of the following. (3x5=15)

(i) Write an account on aquaporins.

(ii) What are mycorrhizae? Explain the role of mycorrhizae in nutrient uptake.

(iii) Discuss stomatal movements in the light of Proton Transport Theory.

(iv) Describe Munich's Mass Flow Hypothesis.

6. Attempt any three of the following. (3x5=15)

(i) Using a suitable diagram explain how water moves from the soil to the root up to the xylem.

(ii) Write an account on jasmonic acid.

(iii) Discuss the ABC model of flowering.

(iv) Discuss the role of Gibberellic Acid in induction of α -amylase activity in cereal grains.

7. Give brief answers to **any five** of the following. (5x3=15)

(i) What is meant by Triple Response in the context of ethylene?

(ii) Give one important function each of Ca, S and K.

(iii) Why are cytokinins called cell cycle regulators?

(iv) Explain why chelating agents are used in the nutrient media.

- (v) What are ringing/girdling experiments? What is their significance?
- (vi) Explain the effect of blue light on the stomatal movements.

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Your Roll No. :2019.....

Sl. No. of Q. Paper : 7866 J

Unique Paper Code : 32167501

Name of the Course : B.Sc.(Hons.) Botany :
DSE - 1

Name of the Paper : Analytical Techniques in
Plant Sciences

Semester : V

Time : 3 Hours **Maximum Marks : 75**

Instructions for candidates :

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
 - (b) Question **NO.1** is compulsory.
 - (b) Attempt **five** questions in all, including Question **No. 1**.
 - (d) Attempt all parts of the question together.
1. (a) Name a marker enzyme for the following organelles (any **five**) : 1×5=5
- (i) Lysosomes

P.T.O.

- (ii) Mitochondria
- (iii) Chloroplast
- (iv) Golgi Apparatus
- (v) Endoplasmic Reticulum
- (vi) Nucleus

(b) Fill in the blanks (any **five**) :

1×5=5

- (i) Sedimentation rate of a particle at a specific RCF depends on its and
- (ii) Stepwise isolation of sub-cellular particles during successive centrifugation is called
- (iii) is a specialized kind of chromatography performed under high pressure for better resolution of components.
- (iv) is the technique used for determining the age of fossils.

(v) Radioisotopes have neutron : proton ratio greater than

(vi) is the ability to distinguish two close objects as distinct.

(c) Explain the function/use of the following (any **five**) : 1×5=5

- (i) Deuterium Lamp
- (ii) Osmium Tetroxide
- (iii) Lead Shield
- (iv) Electron Gun
- (v) Probe
- (vi) SDS

2. (a) Explain the working of spectrophotometer with reference to the Beer- Lambert law. What are the applications of UV and visible spectrophotometer ? 9
- (b) Discuss the technique of autoradiography. List **five** radioisotopes that can be used to study biomolecules/ biological processes. 6

3. (a) What is Blotting ? Explain the technique of Western/ Southern Blotting in detail.

10

(b) What are the measures of central tendency ? Discuss briefly Arithmetic Mean, Median and Mode.

5

4. (a) Write an account of chromosome banding technique. Mention the application of this technique.

8

(b) Using a ray diagram explain the working of a confocal microscope.

7

5. Differentiate between (any **three**) :

5×3=15

(a) Paper chromatography and thin layer chromatography

(b) Positive staining and negative staining

(c) AGE and PAGE

(d) SEM and TEM

(e) HPLC and GLC

6. Explain why (any **five**) :

3×5=15

(a) Column of electron microscope is placed under vacuum.

(b) TEMED and APS should be added just before casting of gel.

(c) Salts of heavy metals are used as stain in electron microscopy.

(d) Resolution of electron microscopy is higher than light microscope.

(e) Acrylamide gel are used for DNA Sequencing.

- (f) Small amount of bisacrylamide is added in acrylamide for Polyacrylamide gel polymerization.
- (g) Glycerol and bromophenol blue is added to the DNA while loading it onto the gel.

7. Attempt (any **three**) : $5 \times 3 = 15$

- (a) In garden pea, Smooth seeds are (R) is dominant to wrinkled seeds (r). In a cross between a plant homozygous for smooth seeds and wrinkled seeds, the following progeny was obtained in F₂ generation

Smooth seeds 5474

Wrinkled seeds 1850

Perform chi-square analysis to see if the data fits into the expected results of the cross.

- (b) With the help of diagram explain affinity chromatography.
- (c) Briefly explain the pulse chase experiment used in biological research.
- (d) Write a short note on X-ray Crystallography.

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Your Roll No. :2019.....

Sl. No. of Q. Paper : **8006** **J**

Unique Paper Code : 32167502

Name of the Course : **B.Sc.(Hons.)**
Botany : DSE - 2

Name of the Paper : Biostatistics

Semester : V

Time : 3 Hours

Maximum Marks : 75

Instructions for candidates :

- (i) Write your Roll No. on the top immediately on receipt of this question paper.
- (ii) Attempt any **five** questions in all.
- (iii) Question **NO.1** is compulsory.
- (iv) Nonscientific calculator allowed. Statistical tables provided by the college may be used if required.

1. (a) Define (any **five**) : 1×5=5
- (i) Mode
 - (ii) Null hypothesis

P.T.O.

- (iii) Central tendency
- (iv) Quartile
- (v) Frequency polygon
- (vi) Normal distribution curve

(b) **True and false** (any **five**) :

1×5=5

- (i) The father of Biostatistics is Francis Galton.
- (ii) Range is not represented as difference between highest and lowest value of the variable.
- (iii) Relative frequency is percentage of each specific frequency out of the total frequency.
- (iv) The variable which influences the values is called as an independent variable.

(v) **Standard deviation** was first suggested by Karl Pearson.

(vi) The conclusions obtained statistically are universally true.

(c) Identify the symbol and abbreviations used in statistics (any **five**) : 1×5=5

- (i) σ
- (ii) f_o
- (iii) U
- (iv) ρ
- (v) Q_2
- (vi) SE_M

2. (a) What do you mean by sampling ? What are the different types of sampling ? Point out the merits and demerits of sampling techniques. 2+3+2=7

(b) What do you understand by data ? Describe various methods of classification of data with suitable examples. 2+6=8

3. Differentiate between (any **five**) :

3×5=15

- Mean deviation and quartile deviation
- Diagram and Graph
- Linear and Non-linear correlation
- Paired and Unpaired t test
- Class interval and Class frequency
- Sampling and Non-sampling error

4. (a) What do you understand by Standard deviation ? How to calculate S.D ? Discuss its merits and demerits.

1+2+2=5

(b) Calculate the standard deviation and mean deviation and interpret results of the given data :

2+2+1=5

X= 10, 13, 17, 22, 27, 30, 31, 32

(c) Calculate the median from the given data :

5

Yield (kg)	0-3	3-6	6-9	9-12	12-15
No. of Plants	4	8	22	10	4

5. (a) Following results obtained in a dihybrid cross, involving shape and color of the seeds

Round/ yellow	Round/ Green	Wrinkled/ Yellow	Wrinkled/ Green
317	109	102	32

If the dihybrid ratio is 9:3:3:1, the plants should have been 315 Round/Yellow, 105 Round/Green, 105 Wrinkled/Yellow, 35 wrinkled/green. Calculate χ^2 (Chi-square) value and draw your conclusion.

5+2=7

(b) Calculate regression coefficient of the following data. Find out the regression equation :

8

X	16.5	11.6	11.4	14.3	14.0	12.2	9.8	14.0	3.5	8.0	12.6	14.4
Y	6.4	6.5	6.6	8.7	6.5	5.9	3.9	3.4	3.0	5.7	4.5	6.5

6. (a) The body weight (kg) of 8 adult males & of 8 adult females is presented in the given table. Find out whether or not the mean weight of males is significantly higher than that of females. Calculate student's t-test at 5% level of significance. 6

Males wt. (kg)	50	58	60	55	59	56	54	64
Females wt. (kg)	49	52	51	56	55	53	52	48

- (b) Calculate the Karl Pearson's correlation coefficient of the given data : 4

X	57	42	40	38	42	45	42	44	40	46	44	43
Y	10	26	30	41	29	27	27	19	18	19	31	29

- (c) Write short note (any **two**) :

2.5×2=5

- (i) Scatter method of studying correlation
- (ii) Regression lines
- (iii) Questionnaire with suitable example