[This question paper contains 4 printed pages.]

(1) Your Roll No 2024.

Sr. No. of Question Paper : 1544 **G**

Unique Paper Code : 2162011101

Name of the Paper : Plant Diversity and Evolution

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

Semester : I

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all, including Question No. **1** which is compulsory.
3. **All** parts of question must be answered together.
4. **All** questions carry equal marks.
5. Draw diagrams wherever required in support of your answer.

P.T.O.

1. (a) Define the following terms (**any five**) : (1×5=5)

(i) Prophage

(ii) Pyrenoid

(iii) Dolipore septum

(iv) False indusium

(v) Apophysis

(vi) Inflorescence

(b) Fill in the blanks (**any five**) : (1×5=5)

(i) The theory of natural selection was proposed by _____.

(ii) Bryophytes are known as _____ of plant kingdom.

(iii) Pteridophytes are cryptogams with well-developed _____ system.

(iv) *Ephedra* is the source of _____ used for the treatment of asthma.

(v) Colony of Volvox is known as _____.

(vi) _____ is the main constituent of the fungal cell wall.

(c) Give an example (scientific name) **(any five)** : (1×5=5)

(i) Bread Mould

(ii) ss-RNA virus causing disease in plant

(iii) Gymnosperm with vessels in secondary wood

(iv) Maiden hair fern or 'Walking fern

(v) Cord Moss

(vi) Marine brown algae with pneumatocysts

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

(a) Eubacteria and Archaebacteria

(b) Bryophytes and Pteridophytes

(c) Chlorophyceae and Phaeophyceae

(d) Zygomycota and Basidiomycota

3. Draw the well-labelled diagram for the following **(any three)** : (5×3=15)

(a) Structure of bacteriophage

(b) VS passing through gills of *Agaricus* sp.

(c) VS of sporophyll-*Adiantum* sp.

(d) Stages in sexual reproduction (conjugation) in *Spirogyra* sp.

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

(a) What is heterospory? Discuss the evolution of seed habit in *Selaginella*.

(b) What are Myxomycetes? Discuss its affinities with Fungi.

(c) Discuss the various systems of classification in angiosperms.

(d) Discuss the various means of reproduction in *Marchantia*.

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

(a) Transformation in Bacteria

(b) Types of Lichens

(c) Lytic cycle in bacteriophage

(d) Male and Female Strobilus of *Gnetum*

[This question paper contains 4 printed pages.]

(2) Your Roll No. 2024

Sr. No. of Question Paper : 1582 G

Unique Paper Code : 2162011102

Name of the Paper : Cell Biology: Organelles and Biomolecules

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

Semester : I

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1** is compulsory.
3. Attempt **four** questions in all.

1. (a) Define **(any five)** (1×5=5)

   (i) Heterochromatin

   (ii) Actin

   (iii) Hydrogen bond

P.T.O.

(iv) Essential fatty acids

(v) Disaccharide

(vi) Nuclear lamina

(b) Match the following enzymes with the cell organelle in which they are localized. (1×5=5)

(i) RUBISCO	(a) Mitochondria
(ii) Acid Phosphatase	(b) ER
(iii) Succinic dehydrogenase	(c) Nucleus
(iv) DNA polymerase	(d) Chloroplast
(v) Cytochrome b_5 oxidase	(e) Lysosome

(c) Expand the following **(any five)** (1×5=5)

(i) SnRNA

(ii) NOR

(iii) mRNA

(iv) NADH

(v) ATP

(vi) ORF

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

(i) Nucleosome model

(ii) Cytoskeletal elements

(iii) Cell cycle and its regulation

(iv) Double helical structure of DNA

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

(i) SER and RER

(ii) Cell wall and Cell membrane

(iii) Lysosome and Peroxisome

(iv) Nucleoside and Nucleotide

(v) Saturated and Unsaturated fatty acids

(vi) Endocytosis and Exocytosis

4. Draw well labelled diagrams of the following **(any three)** : (5×3=15)

(a) Ultrastructure of Mitochondria

P.T.O.

P.T.O.

(b) Nuclear Pore Complex

(c) Fluid Mosaic model of cell membrane

(d) Ultrastructure of Chloroplast

5. (a) Discuss in detail the structure and role of ATP as energy currency of the cell. (7)

(b) Discuss the role of Golgi apparatus in processing, packaging and sorting of proteins. (8)

6. (a) What are different types of chemical bonds? Discuss about their significance in biology. (7)

(b) Discuss different stages of cell division in a gametic eukaryotic cell. (8)

[This question paper contains 4 printed pages.]

(3) Your Roll No. 2024

Sr. No. of Question Paper : 1620 G

Unique Paper Code : 2162011103

Name of the Paper : Basic Laboratory and Field Skills in Plant Biology

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

Semester : I

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all.
3. All questions carry equal marks.
4. Question No. **1** is compulsory.
5. All parts of a question must be answered together.

P.T.O.

1. (a) Expand the following **(any five)** : (5×1=5)

(i) HPLC

(ii) BLAST

(iii) BOD

(iv) HEPA

(v) EDTA

(vi) TEM

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

(i) Catalogue

(ii) Mordant

(iii) Central tendency

(iv) Buffer

(v) Serial dilution

(vi) Microtome

(c) Fill in the blanks **(any five)** : (5×1=5)

(i) _____ nm is the wavelength range of a visible range spectrophotometer.

(ii) SDS-PAGE is used for the separation of _____ molecules.

(iii) An electric device used to measure hydrogen-ion activity (acidity or alkalinity) in solution is called _____ .

(iv) The chemical molecules that have the ability to absorb light of a certain wavelength and then re-emit light at a longer wavelength is called _____ .

(v) YEB media is used for culturing _____ .

(vi) 1 ml solution is equal to _____ microliters.

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

(i) Fluorescence microscope and Electron microscope

(ii) Primary data and Secondary data collection

(iii) MS Excel and MS PowerPoint

(iv) Molarity and Normality

(v) Sample mean vs population mean

(vi) Pour plate vs spread plate method

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

(i) Agarose Gel Electrophoresis

(ii) Laboratory safety symbols

(iii) Autoclave

(iv) Replica plating

4. (a) Define resolution. Describe different factors that influence the resolution and resolving power of a microscope. (8)

(b) What is a biological database? Explain different types of databases with examples. (7)

5. (a) The length in cm of 10 Vernonia plants is given below. Calculate the standard deviation, standard error and coefficient of variation. (10)

S. No.	1	2	3	4	5	6	7	8	9	10
Length (cm)	20	22	27	30	31	32	35	40	45	48

(b) Draw a bar diagram of the given data : (5)

Year	2016	2017	2018	2019	2020	2021	2022
Production of wheat (Tons)	320	360	440	880	680	850	550

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(4) Your Roll No. 2024

Sr. No. of Question Paper : 3581 **G**

Unique Paper Code : 32165102

Name of the Paper : Plant Anatomy and Embryology

Name of the Course : **Botany**

Semester : I

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 any **five** questions in all, including Question no. **1** which is compulsory.
3. **All** questions carry equal marks.
4. All parts of a question must be attempted together.
5. Draw well-labelled diagrams wherever necessary.

1. (a) Fill in the blanks **(any eight)** : (8×1=8)

   (i) The plane of cell division in the tunica is mainly _____ .

   (ii) *Nymphaea* petiole shows the presence of _____ type of sclereids.

P.T.O.

(iii) Waxy layer above the epidermis is known as _____ .

(iv) Scattered closed vascular bundles are found in _____ .

(v) The contents of the pollen tube are discharged in _____ cell of the embryo-sac.

(vi) _____ is a fleshy outgrowth of integument at the micropylar region of the seed which helps in dispersal and germination.

(vii) The exine is chiefly made up of _____ .

(viii) True ovules are absent in family _____ .

(ix) Leaves of C_4 plants are characterized by the presence of _____ .

(b) Give one-word answer **(any seven)** : (7×1=7)

(i) A carbohydrate composed of β-1,4-linked glucan.

(ii) A leaf where stomata are present on both abaxial and adaxial surfaces.

(iii) Vascular bundle with phloem on either side of the xylem.

(iv) Pollen tube entry into ovule through micropyle.

(v) Development of zygote from egg without syngamy.

(vi) A mechanical tissue rich in lignin.

(vii) Pollen grains in the family Cyperaceae.

(viii) A mechanism to promote cross pollination.

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

(a) Synergid and egg cell

(b) Parenchyma and collenchyma

(c) Monocot and dicot root

(d) Amoeboid tapetum and secretory tapetum

(e) Ray initials and fusiform initials

(f) Heartwood and sapwood

3. Write short note on **(any three)** : (3×5=15)

(a) Dendrochronology

(b) Male germ unit

(c) Entomophily

(d) Types of ovules in angiosperms

4. Draw well labeled diagrams **(any three)** : (3×5=15)

   (a) V.S. of monocot leaf

   (b) T.S. of tetrasporangiate anther showing pollen tetrads

   (c) Ultrastructure of egg apparatus

   (d) T.S. of dicot stem

5. (a) Discuss Körper -Kappe theory of root apex organization. (5)

   (b) Describe the anatomical adaptations in xerophytes with suitable examples. (7)

   (c) Write the contributions of :

      (i) Heslop-Harrison

      (ii) B.M. Johri (3)

OR

Discuss the features of free nuclear type of endosperm with a suitable example.

6. (a) Define 'apomixis' and highlight its practical applications. (5)

   (b) Define 'anemochory' and 'zoochory' and enumerate their adaptations with examples. (6)

   (c) Write a short note on vessel elements and tracheids. (4)