[This question paper contains 8 printed pages.]

Your Roll No................

D

Sr. No. of Question Paper : 1056

Unique Paper Code   : 2162011103

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

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

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 **any four** questions in all

3. Question No. 1 is compulsory

4. Attempt all parts of a question together

1.   (a) Fill in the blanks (any five)

(i) ———— holds the specimen in place between the coverslip and the slide.

(ii) ———— is a device for ventilation while using chemicals producing toxic fumes.

(iii) A ———— is defined as a concentrate solution to be diluted to some lower concentration for actual use.

(iv) A ———— is a solid or liquid preparation used to propagate microorganisms under controlled conditions.

(v) A characteristic that may differ from one individual to another in a population is called a ———— .

(vi) A computerized archive used for the storage and organization of data in such a way that information can be retrieved easily is known as a _____ .

(vii) A value of log100 is _____ .

(b) Select the **True/False** statement **(any five)**

                                          (5×1=5)

(i) A sample of five body weights (in pounds) is as follows: 116, 168, 124, 132, 110. The sample median is 130.

(ii) In MS excel, the formula Average (number 1, number 2, ...) gives the mean of all values.

(iii) A standard herbarium sheet is 10 × 20 cm in size.

(iv) Serial dilution is done to increase the number of bacterial cells per unit volume of a bacterial culture.

(v) Formalin is an alternative name for an aqueous solution of formaldehyde.

(vi) Condenser is a glass lens and used to gather the light coming from the source.

(vii) The concentration of a substance present in a solution can be quantified by measuring light absorbed by it at a particular wavelength.

(c) Match the following   (5×1=5)

Column A	Column B
Electron microscope	Excel
Silver nitrate gel	Sterilization method
Autoclave	Normality
Pie chart	Ultrastructure
Gram equivalent	First-Aid

2. Differentiate between the following (any 5)

$$(3 \times 5 = 15)$$

(a) Compound microscope and Electron microscope

(b) Sample mean and Population mean

(c) LB medium and MS medium

(d) Micrometer and Haemocytometer

(e) MS Excel and MS Powerpoint

(f) Molar and Percent Solutions

3. Briefly describe the following (any five)

$$(5 \times 3 = 15)$$

(a) Sampling methods

(b) Classes of laboratory chemicals

(c) Laminar Air Flow

States	Rainfall (mm)
Delhi	617
Haryana	617
Arunachal Pradesh	2782
Punjab	649
Himachal Pradesh	1251
Assam	2818
Jammu & Kashmir	1011
Orissa	1489
Tamil Nadu	998
Tripura	1881

Sr. No. of Question Paper : 1372   C

Unique Paper Code   : 32161301

Name of the Paper   : Anatomy of Angiosperms

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

Semester   : III

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. **Question no. 1 is compulsory, attempt five questions in all.**

3. Draw well labelled diagrams wherever required and answer all parts of question

P.T.O.

1. (a) Define the following (Any five)   (5×1=5)

   (i) Casparian strips

   (ii) Bulliform cells

   (iii) Exodermis

   (iv) Plasmodesmata

   (v) Dendrochronology

   (vi) Callose

(b) Match the following: (5×1=5)

(1) Commercial cork   (a) *Trochodendron*

(2) Raphides   (b) *Quercus suber*

(3) Lateral root   (c) *Helianthus stem*

(4) Endarch xylem   (d) *Pericycle*

(5) Veselless angiosperm   (e) *Calcium oxalate*

(c) Give suitable examples where following are present

(Any five)   (5×1=5)

(i) Brachysclereids

(ii) Amphicribal vascular bundle

(iii) Angular collenchyma

(iv) Druses

(v) Lysigenous cavity

(vi) Anisocytic stomata

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

   (i) Applications of Plant Anatomy in Forensic science

   (ii) Kranz Anatomy

   (iii) Reaction wood

(iv) Phloem as a dynamic tissue

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

     (i) Heart wood and sap wood

     (ii) Vessels and tracheids

     (iii) Collenchyma and parenchyma

     (iv) Articulated and non-articulated laticifers

     (v) Cutinization and cuticularization

     (vi) Paratracheal and apotracheal parenchyma

4. Draw well labelled diagrams of (Any three): (5×3=15)

    (i) T.S. Periderm showing lenticels

    (ii) T.S of Dicot stem

    (iii) V.S of *Nerium leaf*

    (iv) L.S. Xylem Vessels showing tyloses

5. (a) Early and late wood are formed as a result of seasonal activity of the cambium. Justify the statement with the help of well labelled diagrams.

                                            (8)

(b) Included phloem is the outcome of anomalous secondary growth. Elaborate the statement citing suitable example with the help of well labelled diagram. (7)

6. (a) Classify stomata according to Metcalfe and Chalk along with well labelled diagrams and examples.

(8)

(b) Explain briefly with the help of well labelled diagrams the process of secondary growth in dicot roots (7)

7. (a) Along with suitable examples, describe the anatomical adaptations shown in hydrophytes.

(8)

(b) Explain the organization of root apex with the help of any three suitable theories. Illustrate with well labelled diagrams. (7)

Sr. No. of Question Paper : 1400

Unique Paper Code : 32161302

Name of the Paper : Economic Botany(LOCF)

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

Semester : III

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.

3. **All** questions carry equal marks.

4. Question no. **1** is compulsory.

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

    (i) The source of "Shahi Zafran"

    (ii) Leaf fibres used in making tea bags

    (iii) A major plant source used as a substitute of coffee

    (iv) Leaf used in making bidi

    (v) Plant roots used for making screens in coolers

    (vi) Source of broth used for microbial cultures

P.T.O.

(b) Define any five of the following terms :

    (i) Retting

    (ii) Ratooning

    (iii) Iodine number

    (iv) Lancing

    (v) Caryopsis

    (vi) Pharmacology   (5×1=5)

(c) Expand and write the place where the institutes are located (any five) :

    (i) ICRISAT

    (ii) RRIM

    (iii) IARI

    (iv) SBI

    (v) CIMAP

    (vi) IRRI   (5×1=5)

2. Differentiate between the following (any three) :

    (i) Essential oils and Fatty Oils

    (ii) Black Tea and Green Tea

    (iii) Flue curing and Sun curing

    (iv) White Jute and Tossa Jute

    (v) Indica and Japonica Rice

    (vi) Millets and Cereals   (3×5=15)

3. Draw labelled diagrams of **any three** of the following. Write botanical name and family also. (3×5=15)

    (i) L.S. cotton seed

    (ii) L.S. Clove flower bud

    (iii) T.S. Hesperidium

    (iv) L.S. wheat grain

4. Write short notes on **any three** of the following :

                          (3×5=15)

    (i) Products and By-products of sugarcane industry

    (ii) Extraction methods of fatty oils

    (iii) Importance of legumes

    (iv) Cannabis as multipurpose crop

    (v) Green Revolution

5. (a) What is tapping? Explain different types of tapping and processing of rubber. (1+6+2=9)

    (b) Write botanical name, family, part used and active constituents of **any three** of the following. (3×2=6)

        (i) Poppy

        (ii) Saffron

        (iii) Fever bark tree

        (iv) Tea

6. (a) Explain Vavilov's work on origin of cultivated plants. List all the centres of origin with examples. (2+8=10)

(b) Which state in India is the chief producer for the following (*any five*): (5×1=5)

(i) Black pepper

(ii) Cotton

(iii) Coconut

(iv) Groundnut

(v) Rubber

(vi) Wheat

7. (a) What is retting? Explain the process of retting taking jute as an example. Write economic importance of jute. (1+5+2=8)

(b) Match the following : (7×1=7)

(i) Golden tip   1. Mustard

(ii) Solanin   2. *Linum* usitatissimum

(iii) Multipurpose crop 3. Potato

(iv) Corymbose raceme   4. Tea

(v) Flax   5. *Glycine max*

(vi) Wonderbean   6. Clove

(vii) Eugenol   7. Coconut

Sr. No. of Question Paper : 1418   C

Unique Paper Code : 32161303

Name of the Paper : Genetics

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

Semester : III

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. All Questions carry equal marks.

3. Question No. **1** is compulsory.

4. Attempt five questions in all including **Question No. 1**.

1. (a) Define **(any five)** of the following:

   (i) Pseudodominance

   (ii) Frameshift mutation

(iii) Trisomy

(iv) Epigenetics

(v) Dicentric chromosome

(vi) Transposon   (1×5=5)

(b) Give one contribution of (any five) of the following

(i) Carl Correns

(ii) Barbara McClintock

(iii) Sutton and Boveri

(iv) R. C. Punnett

(v) Hugo de Vries

(vi) Alfred Strutevant   (1×5=5)

(c) Fill in the blanks:

(i) Human females have _____ linkage groups.

(ii) Double monosomy is represented as _____.

(iii) Short legged breed of sheep was named as _____ by Seth Wright.

(iv) _____ is an example of sex-linked recessive trait.

(v) When a gene affects many aspects of phenotype, it is said to be _____.

(1×5=5)

2. Write short notes on (any five) of the following

(i) Photoreactivation repair

(ii) Base Analogs

(iii) Dominant Epistasis

(iv) *cis trans* complementation test

(v) Retrotransposons

(vi) Reciprocal translocation

(vii) Mitochondrial inheritance in Yeast   (3×5=15)

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

(i) Penetrance and Expressivity

(ii) Codominance and Incomplete Dominance

(iii) Test cross and Reciprocal cross

(iv) Paracentric and Pericentric inversion

(v) Allopatric and Sympatric speciation.

(vi) Down's syndrome and Klienefelter's syndrome

(3×5=15)

4. (a) In pea plant, Tall (T) is dominant over dwarf (t), Yellow seed (Y) is dominant over green (y) and • Round seed (R) is dominant over wrinkled seed (r). A homozygous dwarf, green and wrinkled pea plant is crossed to a homozygous tall, yellow and round plant. Using forked line method give the genotypes and phenotypes of parents, F_1 and F_2 progenies.   (8)

    (b) Give an account of the inheritance of Kappa particles in *Paramecium* with diagrams.   (7)

5. (a) In a population of 5000, cystic fibrosis is seen in 125 individuals. How many individuals in the population are the carrier of the gene for cystic fibrosis?   (5)

    (b) Mutations are caused by both environmental and chemical insults. Describe how chemical mutagens induce mutations. Give two examples of useful induced mutations in crop improvement.   (10)

6. (a) An individual heterozygous at three gene loci *Aa*, *Nn*, *Rr* is crossed with the homozygous recessive parent aa nn rr . The frequency of progeny with different genotypes is as follows:

ANR	...	347
ANr		52
Anr		357
Anr		90
AnR		49
AnR		6
a NR		92
a Nr		7
Total progeny		1000

(i) Which classes represent the parental types?

(2)

(ii) Which classes reflect the occurrence of single cross overs and double cross overs? (2)

(iii) Construct the genetic map of the 3 loci involved indicating both map distance and correct gene sequence. (5)

(iv) What is the coefficient of coincidence involved? Also find out the degree of interference. (3)

(b) What is Position effect? Explain with the help of a suitable example. (3)

7. (a) Explain the inheritance of skin color in humans

(5)

(b) What do you understand by ABO blood group series? Explain its genetic basis of inheritance.

(5)

(c) How can you distinguish between the terms haploidy and monoploidy? How can haploids be produced and utilized in plant breeding? (5)

[This question paper contains 8 printed pages.]

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

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

(b) List the various causes of polyembryony an
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)

(1500)

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

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) 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)

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)

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)

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

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)** $(1 \times 5 = 5)$

   (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 tetraoxide 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 monochomator in spectrophometer.

(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

Sr. No. of Question Paper : 1018   **D**

Unique Paper Code   : 2162011101

Name of the Paper   : Plant Diversity and Evolution

Name of the Course   : **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 number **1**, which is compulsory.

3. **All** questions carry equal marks.

4. All parts of a question must be answered together.

5. Draw diagrams wherever required.

1. (a) Match the following :   (1×5)

      (i) Ribbon shaped chloroplasts   (a) *Selaginella*

      (ii) Air bladders   (b) *Gnetum*

(iii) Resurrection Plant

(c) *Sargassum*

(iv) Presence of vessels

(d) Bacillus

(v) Rod Shaped Bacteria

(e) *Spirogyra*

(b) Fill in the blanks :

(1×5)

(i) Viruses are composed of a central core of nucleic acid surrounded by a protein coat called a _____ .

(ii) The ventral surface of the thallus of *Marchantia* bears _____ and _____ scales.

(iii) Protein monomer of bacterial flagella is called _____ .

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

(v) Bentham and Hooker's system of classification is an example of _____ system of classification.

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

(i) Transduction

(ii) Plasmid

(iii) Heterospory

(iv) Mycelium

(v) Dolipore septum

(vi) Pollen grain

2. Distinguish between any **three** of the following in a tabular manner and draw diagrams wherever required :

(5×3=15)

(a) Antheridiophore and archegoniophore of *Marchantia*

(b) Lytic and Lysogenic cycle of bacteriophage

(c) Gram positive and Gram negative bacteria

(d) Gymnosperms and Angiosperms

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

(a) Binary fission in bacteria

(b) Natural selection

(c) Fairy rings

(d) Asexual reproduction in *Marchantia*

4.   Draw a well labeled diagram of followings : (any three)   (5×3=15)

   (a) LS strobilus of *Selaginella*

   (b) LS basidiocarp of *Agaricus*

   (c) EM Bacteria

   (d) LS capsule of *Funaria*

5.   (a) Describe the Asexual reproduction in *Rhizopus*.

   (b) Discuss heterospory and seed habit in *Selaginella*.

   (c) Give an account of general characteristics of Angiosperms.   (5×3=15)

[This question paper contains 4 printed pages.]

Your Roll No..............

D

Sr. No. of Question Paper : 1037

Unique Paper Code : 2162011102

Name of the Paper : Cell Biology: Organelles and Biomolecules

Name of the Course : **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) Fill in the blanks **(any five)**   (1×5=5)

    (i) Gunter Blobel and David Sabatini proposed the _____ .

P.T.O.

(ii) Marker enzyme for mitochondria is _____.

(iii) _____ is a lysosomal storage disease.

(iv) A non-membranous cell organelle is _____.

(v) Fluid mosaic model of plasma membrane model is proposed by _____ .

(vi) Disulphide bonds are formed in _____ .

(b) Define **any five**   (1×5=5)

  (i) Reducing sugars

  (ii) Hydrogen bonds

  (iii) Chromatin

    (i) Essential Fatty Acids

    (ii) Nucleoid

    (iii) Heterophagy

(c) Write at least one contribution of the following scientists   (1×5=5)

  (i) Linn Margulis

      (ii) Rosalind Franklin

      (iii) C Benda

      (iv) George Palade

         (i) Fritz Lipmann

         (ii) Christian De Duve

         (iii) Camillo Golgi

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

    (i)   Prokaryotic and eukaryotic cell

    (ii)   RER and SER

    (iii) Primary and Secondary cell wall

    (iv) Microtubule and Microfilament

    (v)   Mitosis and Meiosis

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

    (i)   Nuclear Pore Complex

    (ii)   ATP as energy currency molecule

    (iii) Peroxisome

    (iv) Semi-autonomous nature of chloroplast

4. Draw Ultrastructures of   (5×3=15)

   (i) Mitochondria

   (ii) Nucleus

   (iii) Fluid Mosaic Model

5. Attempt **any three**   (5×3=15)

   (i) Explain the process of regulation of cell cycle.

   (ii) Give an account of polymorphic forms of lysosomes.

   (iii) What are the constituents of cell wall? Describe its structure and function.

   (iv) Explain the role of microtubule in the transport of macromolecules and organelles in the cytoplasm

6. Attempt **any three**   (5×3=15)

   (i) Describe the various levels of protein structure.

   (ii) What are the salient features of DNA structure?

   (iii) Write a note on lipids as cell membrane constituents.

   (iv) Write a note of biological significance of chemical bonds.

(2000)

Your Roll No...............

Sr. No. of Question Paper : 1187 · C

Unique Paper Code : 32167502

Name of the Paper : Biostatistics

Name of the Course : **Botany : DSE for Hons**

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 any **five** questions in all.

3. Question number **one** is compulsory

4. Nonscientific calculator allowed, statistical tables provided by the college may be used if required.

1. (a) Define **(Any Five)** : (1×5=5)

    (i) Ordinal scale of measurement

    (ii) Descriptive statistics

(iii) Relative frequency

(iv) Bivariate analysis

(v) Parametric test

(vi) Class interval

(b) Fill in the blanks (Any Five) : (1×5=5)

(i) Measure of asymmetry in a distribution is given by _____ .

(ii) In _____, numerical data is depicted on the geographical map.

(iii) Chance of rejecting a true null hypothesis is known as _____ .

(iv _____ is the measure of central tendency, which can be located graphically through ogive / cumulative frequency curve.

(v) Probability of rare events (e.g. chance of happening of accident on road) will fit best to the _____ distribution.

(vi) _____ is the most suitable measure of central tendency for speed, ratio, and percentage.

(c) Match the following :   (1×5=5)

(i) Q_2	(a) Carl Gauss
(ii) Leaf size	(b) F-test
(iii) Hospital records	(c) Continuous variable
(iv) Significance of difference between two variances	(d) Median
(v) Normal Distribution	(e) Secondary data

Discuss the following **(Any Three)** :   (5×3=15)

(a) Describe application of statistics in different

fields of biology. What are major limitations of biostatistics?

(b) Define tabulation of data and mention its merits. Describe different types of tables with the help of suitable examples.

(c) Enumerate important features of bar diagram. Explain various types of bar diagram with the help of suitable examples.

(d) Describe primary data. Explain questionnaire and interview-based method of data collection.

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

(a) Quartile deviation and standard deviation

(b) Cluster sampling and quota sampling

(c) Interval and ratio scale

(d) Diagrammatic and Graphical presentation of data

(c) Chronological and geographical data

4.   (a) Prepare frequency polygon from the following data.   (3)

Class Interval	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Frequency	6	11	17	9	4

(b) What is coefficient of variation? Price of rice and bajra in different years is given below. Find out which grain has more stable price.   (5)

Years	2018	2019	2020	2021	2022
Rice	20	22	19	23	16
Bajra	10	20	18	12	15

(c) Define mode, and enumerate its merits and demerits. Calculate mode for the following data applying grouping method.   (7)

P.T.O.

No. of fruit/plant (x)	7	8	9	10	11	12	13	14	15	16	17
Frequency	47	54	58	60	66	64	55	40	69	53	45

5. (a) Explain null and alternative hypothesis. Lay down hypotheses and perform appropriate hypothesis test for the following data to find out whether the goat fed with two different diets (A and B) exhibit significant different in their weights (at 5% level of significance). (6)

Weight of goats fed with diet A (kgs)	25	32	30	32	24	14	32	-	-	-
Weight of goat fed with diet B (kgs)	24	34	22	30	42	31	40	30	32	35

(b) A fertilizer packing machine claims to deliver 12 kg in each of the packing bags. After packing, ten random bags were weighed by a machine-inspector and found their weights as 11, 14, 13, 12, 13, 12, 13, 14, 12, 11 kg. Find out whether the machine could be declared defective at 5% level of significance. (4)

(c) In a city, the accidents were reported below on the basis of days in week. Calculate if number of accidents are significantly different from each other at 5% level of significance. (5)

Days	Mon	Tue	Wed	Thu	Fri	Sat	Sun
No. of accidents	15	17	12	10	14	20	17

6. (a) Differentiate between Karl Pearson's and Spearman's rank correlation coefficient. Calculate Spearman's rank correlation coefficient (p) for ranks obtained by ten students in mathematics and statistics as tabulated below : (7)

Mathematics	7	8	2	1	9	9	12	11	4	10	6	5
Statistics	6	4	1	3	11	12	12	10	5	9	7	8

(b) Enumerate similarities between correlation and regression. From the following data (of age of husband and wife) calculate the regression

equation. Predict wife's age, when husband's age is 33 years.   (8)

Wife's age (years)	18	20	22	23	27	28	30
Husband's age (years)	23	25	27	30	32	31	35