

Exam. Code : 103202

Subject Code : 1287

B.A./B.Sc. Semester—II

BOTANY

Paper—II A (Cell Biology)

Time Allowed—3 Hours]

[Maximum Marks—35

Note : Attempt any **FIVE** questions from the following.

Question No. 1 is compulsory. All questions carry equal marks.

1. Write briefly about the following :

- (i) Nucleoplasm
- (ii) Plasmids
- (iii) Functions of nucleolus
- (iv) Chromatin
- (v) Aneuploidy
- (vi) Bilayer lipid structure
- (vii) Centromere.



- 2. Discuss about the nuclear membrane and its functions with well labelled diagrams.
- 3. What is the difference between mitochondrial and chloroplast DNA ? Describe mitochondrial DNA.

4. How do chromosomal alterations occur in nature ?
Describe the different type of inversions.
5. Discuss peroxisomes and its metabolic functions.
6. Describe the morphology of a chromosome.
7. Write short notes on :
 - (i) Robertsonian translocation
 - (ii) Duplications
8. What is polyploidy ? Discuss its significance in crop plants.
9. Describe the structure and function of the plasma membrane.

Exam. Code : 103202

Subject Code : 1288

B.A./B.Sc. Semester—II

BOTANY

Paper—II (B) (Genetics)

Time Allowed—3 Hours]

[Maximum Marks—35

Note : Attempt **FIVE** questions in all. Question No. 1 is compulsory. All questions carry equal marks.

1. Give short answers :

- (a) Centromere
- (b) Semi conservative DNA replication
- (c) Cytokinesis
- (d) Template strand
- (e) Anticodon loop
- (f) Homozygosity
- (g) Polymorph.

1×7=7

2. Discuss properties of Genetic material DNA versus RNA.

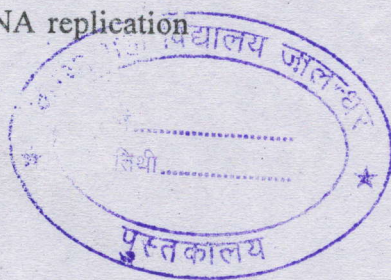
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3. Describe various stages of Mitosis with the help of well labelled diagrams.

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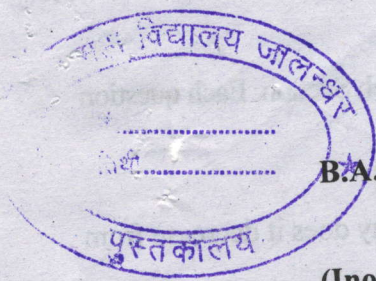
4. Describe structure and working of Transcription unit and the gene.

3.5×2=7



5. Discuss structure of the tRNA and the process of Translation. 7
6. Describe 1D, 2D and 3D structure of protein biomolecules and their significance. 7
7. Discuss gene regulation mechanism in prokaryotes. 7
8. Discuss Mendel's Law of segregation of characters with suitable examples. 7
9. Discuss role of Mutations in genetic variations and adaptations. 7

6-5-17



Exam. Code : 103202

Subject Code : 1292

B.A./B.Sc. Semester—II

CHEMISTRY

(Inorganic Chemistry—II)

Time Allowed—3 Hours]

[Maximum Marks—35

PART—A

Attempt **ALL** questions. Each question carries **1** mark.

1. Write down the reaction of borax with water.
2. Give a chemical reaction to show that Tin(II) is a reducing agent.
3. Comment upon the first ionization potentials of alkali and alkaline earth metals.
4. What are the factors responsible for diagonal relationship ?
5. What is the Lewis acid ? Give an example.
6. For the coordination number 5 name the possible geometries.
7. What is the main cause of colour of Potassium permanganate ?
8. How does the effective nuclear charge experienced by the transition elements when we move from left to right along a series ?

PART—B

Attempt **TWO** questions from each Section. Each question carries $4\frac{1}{2}$ marks.

SECTION—I

9. What is Ionisation enthalpy ? Why does it decrease from carbon to silicon ?
10. Discuss the shape and hybridisation of BF_3 . Comment upon the B-F bond lengths in BF_3 .
11. With the help of reactions, justify the amphoteric nature of aluminium.

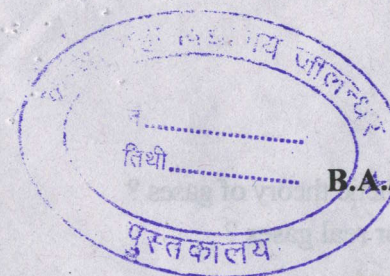
SECTION—II

12. How is silicon tetrachloride prepared ? Discuss its properties.
13. Discuss in detail the structure of tetrasulfur tetranitride. Comment on the electron distribution in the ring.
14. Write a note on the Arrhenius theory of acids and bases with the help of examples.

SECTION—III

15. What are the factors responsible for colour and magnetic behavior of the transition elements ? Discuss with the help of examples.
16. Comment upon the fact that the lowest oxide of a transition metal is basic whereas the highest oxide is usually acidic.
17. Why do the second and third rows of transition elements resemble each other much more closely than they resemble the first row ?

16. (a) Describe Beckmann's method for the determination of depression in freezing point of a liquid when non volatile solute is dissolved in it.
- (b) The boiling point of chloroform is raised by 0.325 K when 5.14×10^{-4} kg of a solute is dissolved in 3.5×10^{-2} kg of chloroform. Calculate the molar mass of the solute ($K_b = 3.9$).
17. (a) What is van't Hoff factor ? How is it used in the determination of degree of dissociation of a solute ?
- (b) A 5.23% solution of cane sugar is isotonic with 0.9% solution of an unknown solute. Calculate the molar mass of the solute. $6 \times 4\frac{1}{2} = 27$



Exam. Code : 103202
Subject Code : 1293

B.A./B.Sc. Semester—II

CHEMISTRY

(Physical Chemistry—I)

Time Allowed—3 Hours]

[Maximum Marks—35

PART—A

Note :— Attempt **ALL** the questions of Part—A and **SIX** questions from Part—B selecting **TWO** questions from each Section (Sections I, II and III). Log tables and scientific calculators are allowed.

1. What is the significance of van der Waal's constants ?
2. Why do gases fail to obey the ideal gas equation at high pressure ?
3. What is average velocity ?
4. What are the characteristic features of nematic liquid crystals ?
5. Define Hardy-Schulze rule.
6. What are isotonic solutions ?
7. Define activity and activity coefficient.
8. What is meant by abnormal molar mass ? $8 \times 1 = 8$

PART—B

SECTION—I

9. (a) What are the assumptions of kinetic theory of gases ? Which of them are not valid for real gases ?
- (b) What are the limitations of the ideal gas equation ? What improvements have been suggested by van der Waal ?
- (c) At what temperature the root mean square velocity of CO_2 gas will be equal to that of oxygen gas at S.T.P. ?
10. (a) Derive expressions for the critical constants in terms of van der Waal's constants.
- (b) If the critical pressure, reduced volume and the reduced temperature of a gas are 45 atm, 10.5 and 0.9 respectively. Calculate the pressure exerted by the gas.
11. (a) Give a brief account of Maxwell distribution of molecular velocities.
- (b) Define mean free path. Derive an expression for it in terms of molecular diameter of the gas molecules.
- (c) Write short note on liquefaction of gases.

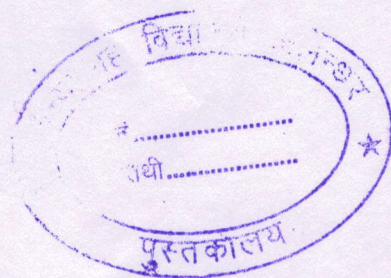
SECTION—II

12. (a) Discuss how solids are structurally different from gases.
- (b) Give a brief account of the classification of liquid crystals.
- (c) Write a short note on seven segment cell.
13. (a) Explain the structure of liquids.
- (b) Describe the kinetic properties of colloids.
- (c) What are the important applications of colloids ?
14. (a) What are emulsions ? How are these prepared ?
- (b) What are protective colloids ? How do they act ?
- (c) Differentiate between liquid and liquid crystal.

SECTION—III

15. (a) What are the different methods of expressing concentrations of solutions ?
- (b) Explain the method of relative lowering of vapour pressure for the determination of molecular mass of a solute.

Sr.No.2562



Exam. Code: 103202

Subject Code: 1297

B.A./B.Sc. - 2nd Sem.

(2517)

Paper : Food Science & Quality Control

(Food Plant Hygiene and Sanitation)

Time allowed: 3 hrs.

Max. Marks: 75

Attempt five questions in total.

Attempt at least one question from each unit and not more than two from any unit.

Each question carries equal marks (15 marks).

UNIT-I

Q.I. What is hygiene? How can a food handler avoid contamination through the following:

- a) Skin b) Hands and nails c) Nose, mouth and throat
- d) Clothing and Personal habits

(2; 3,3,4,3)

Q.II. a) Explain the working of cleaning agents. How can cleaning compounds be classified?
Give examples. (8)

b) What precautions should be taken for the handling, storage and transportation of
cleaning compounds. (7)

UNIT-II

Q.III. What are disinfectants or sanitizers? Discuss various methods for sanitization of food plant
and its equipment. (3,12)

Q.IV. Elaborate in detail various procedures adopted for sanitation of a fruit and vegetable
processing plant. (15)

UNIT-III

Q.V. Discuss various methods for detection and control of insect infestation in a food processing
plant. Enlist the precautions to be taken while handling of pesticides. (10,5)

Q.VI. What different types of wastes are produced in a dairy industry? Discuss various methods
for waste treatment and their disposal. (5,10)

Q.VII. What are various uses of water in a food processing industry? Discuss methods for the
maintenance of hygiene of water for processing. (8,7)

2562(2517)100



Sr. No. 2563

Exam. Code: 103202
Subject Code : 1301

B.A./B.Sc. 2nd Sem.

(2517)

Paper - Microbiology (Basic Food Microbiology)

Time allowed: 3 hrs.

Max. Marks: 75

Note: Attempt one question from each of the four units. Question no. I is compulsory. All questions carry equal marks.

I. Compulsory. Your attempt to each part should not exceed more than 3-4 lines.

- i) Hydrophilic colloids
- ii) Inhibitory substances
- iii) Arthrospores
- iv) Psychrotrophic
- v) Stemphylium
- vi) Endospores
- vii) Saccharolytic bacteria
- viii) Associative growth
- ix) Temper miso
- x) Pasteurization

UNIT I

II. Discuss:

- i) Factors affecting a_w requirements of microorganisms
- ii) Accessory food substances

III. Support your response to the statement with needful explanation that nutrients in the food, their kinds and proportions are all important in determining what organism is most likely to grow.

UNIT II

IV. Describe briefly the various steps followed in preparation of bread.

V. Write on:

- i) Use of preservatives
- ii) Changes during storage

(2)

UNIT III

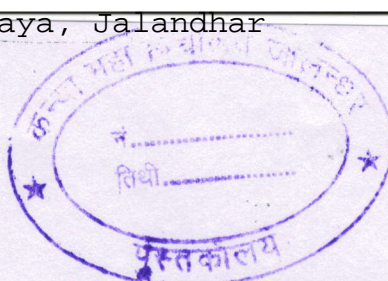
- VI.** Discuss the general principles of food preservation with suitable examples.
- VII.** Write explanatory notes for:
- i) Prevention of spoilage
 - ii) Packaging of foods

UNIT IV

- VIII.** What are the methods being followed for preventing spoilage of various milk and milk products.
- IX.** What do you know about the following?
- i) Food poisoning
 - ii) Salmonella intoxications

2563(2517)100

Sr. No. 2557



Exam. Code: 103202
Subject Code : 1302

B.A./B.Sc. 2nd Sem.

(2517)

Paper - Clinical Nutrition & Dietetics Paper-A (Meal Management)

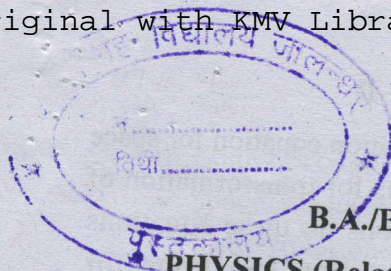
Time allowed: 3 hrs.

Max. Marks: 40

Note: Attempt **five** questions in all. Question No. 1 is compulsory. Each question carries 8 marks.

1. a) Define RDA.
b) Write down RDA for an adult female, moderate worker (Energy and Protein).
c) What is the meaning of exchange lists?
d) Define food preservation. (4x2)
2. Explain important Food groups? Elaborate the concept of Exchange lists. (4+4)
3. What do you mean by meal planning? What are its important principles? (8)
4. What are the physiological changes that occur during lactation? Discuss nutritional requirements during this period. (3+5)
5. Write short note on Growth and development of infancy and adolescents. (4+4)
6. Write the importance of food preservation. Explain important principles of food preservation. (8)
7. What are the physiological changes during old age and their effect on the food requirements of elders? Explain. (8)
8. Explain
 - a) concept of Balanced diet.
 - b) Calorie consumption units in meal planning (8)

2557(2517)100



Exam. Code : 103202
Subject Code : 1304

B.A./B.Sc. Semester-II

PHYSICS (Relativity & Electromagnetism)

Paper-A

Time Allowed—3 Hours]

[Maximum Marks—35

Note : There are **FIVE** questions in total. Section A is compulsory. Attempt **ONE** question each from Sections B, C, D and E.

SECTION—A

- I. (i) What are the applications of Hall's effect ?
(ii) Define skin depth.
(iii) A clock gives correct time. With what speed it be moved relative to an observer so that it may be seem to lose 1 minute in 24 hrs ?
(iv) What is the direction of force between two parallel wires carrying currents in opposite directions ?
(v) What is the phase difference between electric and magnetic field vectors of an em wave in conducting medium and why ?
(vi) Which equation shows that isolated magnetic poles do not exist ?
(vii) What is Minkowski space ?

$1 \times 7 = 7$

SECTION—B

- II. Starting from Lorentz transformation equation for space coordinates derive the equations for transformation of velocities. Under what conditions do these equations reduce to Galilean transformation equations for velocities ? 7
- III. What do you understand by relativistic Doppler's effect ? Describe an expression for longitudinal Doppler's effect. 7

SECTION—C

- IV. State and explain Hall's Effect and mention its significance. 7
- V. State and explain Ampere's circuital law. Use it to find the magnetic field due to a toroid solenoid. Also derive its differential form. 7

SECTION—D

- VI. Calculate the work done in establishing a current I in circuit having self inductance. Hence prove that the coefficient of self inductance is numerically twice the work done in establishing a unit current in an inductor. 7
- VII. (a) Explain the concept of displacement current and derive an expression for the same in a region where electric field is changing with time. 4
- (b) What is Q -factor and find it for series resonant circuit ? 3

SECTION—E

- VIII. State Maxwell's equations for electromagnetism in free space, discussing each critically. What information do these equations furnish with regard to electromagnetic nature of light ? 7
- IX. (a) Define Poynting vector for em wave and find its average value for plane sinusoidal wave. 5
- (b) What do you mean by dispersion ? Explain its types. 2



SECTION—E

8. (a) What do you mean by the characteristic impedance of a string ? Show that it is given by the product of the mass per unit length of the string and the wave velocity. 5
- (b) Define reflection and transmission coefficient of energy. How are they related ? 2
9. (a) Define the terms wave velocity and group velocity. Find the relation between wave velocity and group velocity. Is group velocity always greater than wave velocity ? 5
- (b) What is the need of impedance matching ? Define coupling element. What are the conditions for perfect coupling element ? 2

B.A./B.Sc. 2nd Semester
PHYSICS
Paper—B
(Vibration and Waves)

Time Allowed—Three Hours] [Maximum Marks—35

Note :— The question paper has **five** sections. Attempt all questions in Section A and **ONE** question each from Sections B, C, D and E.

SECTION—A

1. (a) What is the necessary condition for a particle for executing SHM ?
- (b) Define relaxation time of an oscillator.
- (c) What is the phase relation between velocity and acceleration in SHM ?
- (d) When is the power delivered to the oscillator by driving force maximum ?
- (e) What is the value of shape for 'in phase' and 'out of phase' mode of oscillation ?
- (f) How a dispersive medium is distinguished from a non-dispersive medium ?
- (g) Find the resonant frequency of an LC circuit containing $C = 2\mu\text{F}$ and $L = 20\text{H}$. $1 \times 7 = 7$

SECTION—B

2. (a) Define SHM. Derive the equation of motion of simple harmonic oscillator. Find an expression for total energy of harmonic oscillator. Prove that it is conserved. 5
- (b) A force of 4500 dyne stretches a vertical spring by 3 cm. Find the mass which should be suspended from this spring, so that system has an angular frequency of 5 rad/s. 2
3. (a) What is a compound pendulum ? Obtain an expression for its time period T. Prove that centre of oscillation and centre of suspension are interchangeable. 5
- (b) Prove that the velocity of a particle executing SHM at a distance of $\frac{\sqrt{3}}{2}$ of its amplitude from the centre is half of its velocity at mean position. 2

SECTION—C

4. (a) What is meant by logarithmic decrement and Q-factor of a damped oscillator ? Deduce their values. Show that lower the damping, the higher will be the quality factor. 4

- (b) Show that the ratio of energy lost per cycle to the energy stored in a damped oscillator is $\frac{2\pi}{Q}$, where Q is the quality factor. 3

5. (a) What causes damping in simple harmonic electrical oscillator ? Derive an equation of damped simple harmonic electrical oscillator and find its solution. Discuss different cases. 5
- (b) Why coils of moving coil galvanometer, ammeter and voltmeters are wound on the metallic frame ? 2

SECTION—D

6. (a) Show that the average power supplied to a forced oscillator is equal to the average power dissipated. 4
- (b) What do you mean by amplification factor ? Show that the displacement at low frequency is amplified by a Q factor at displacement resonance. 3
7. (a) Two-LC circuits are coupled by mutual inductances. Discuss the behaviour of a coupled system and find the frequency of oscillation of the system. 4
- (b) Show that in the resonant LCR circuit, the maximum potential drop across a capacitor occurs

at a frequency $\omega = \omega_0 \left(1 - \frac{1}{2Q^2}\right)^{\frac{1}{2}}$. 3

Exam. Code : 103202
Subject Code : 1307

B.A./B.Sc. 2nd Semester

ZOOLOGY

Paper—Zoo-II(A) (Ecology)

Time Allowed—3 Hours]

[Maximum Marks—35

Note :- (1) Q. 1 is compulsory.

(2) **Four** questions are to be attempted, selecting **ONE** question from each **Section**. All questions carry equal marks.

(3) Illustrate your answer with suitable diagrams wherever necessary.

1. Explain in 2-3 lines :

- (i) Pedogenesis
- (ii) Commensalism
- (iii) Synecology
- (iv) Hydrocoels
- (v) Food Web
- (vi) Bioindicators
- (vii) Biotic Potential.

SECTION—I

2. Give an account of the effect of topographic factors on the distribution of animals giving suitable examples.

3. Write explanatory notes on :

- (a) Ecological energetics
- (b) Food web.

SECTION—II

- 4. (a) Explain in detail the Shelford's law of tolerance.
(b) Biogeochemical cycles.
- 5. Giving suitable examples discuss the mechanism of ecological adaptations in Xerophytes.

SECTION—III

- 6. Write short notes on :
 - (a) Biological potential
 - (b) Mortality and natality.
- 7. Define succession; describe the causes, trends and basic types of succession.

SECTION—IV

- 8. Write explanatory notes on the following :
 - (a) Social forestry
 - (b) Wind power.
- 9. Give an account of sources and pollutants of air pollution and describe suitable measures to control air pollution.

8. (A) Differentiate between multiple row and multiple column
sub queries with suitable examples. 8

(B) Explain the use of Function in PL/SQL with example. 7

B.A./B.Sc. 2nd Semester

BIOINFORMATICS

**(Basic Mathematics, Biostatistics & Database
Management System)**

Time Allowed—Three Hours] [Maximum Marks—75

Note :—(1) Section A is compulsory. Each part is of
1.5 marks.

(2) Attempt **ONE** question from each unit of
Section B. Each question is of **15** marks.

SECTION—A

Note :— All questions are compulsory. Each Question is of
1 mark.

1. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -1 & 3 \\ -1 & 0 & 2 \end{bmatrix}$, find $2A - B$.

2. A class consists of 12 boys and 10 Girls. A Committee
of 3 students is constituted. What is the probability that
committee has all the girls ?

3. Briefly define median with suitable example.

4. Briefly define range of function.

5. Give any three characteristics of DBMS.

6. Briefly define view in SQL.
7. Briefly define 3NF.
8. Explain *Select* statement with suitable example.
9. Write a short note on creation of Procedure in SQL.
10. Differentiate between local and stored Procedures.

SECTION—B

UNIT—I

1. (A) Find the inverse of the following matrix :

$$A = \begin{bmatrix} -1 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$

10

- (B) Differentiate $\log[(x+2)(x^3 - x)]$ w.r.t. x 5

2. (A) Write short notes on following :—

- (i) Transpose Matrix
- (ii) Conjugate Matrix
- (iii) Symmetric Matrix
- (iv) Determinant of Matrix
- (v) Identity Matrix.

10

- (B) Integrate $x^2 + 3x + 4$ with respect to x . 5

UNIT—II

3. (A) Discuss Poisson Distribution in detail. 8
- (B) Calculate the Mean and Standard Deviation for following data :

7, 15, 10, 9, 4, 3, 7, 10, 10, 8, 16. 7

4. (A) Discuss correlation and distinguish between perfect positive and perfect negative correlation with suitable examples. 8
- (B) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is $\frac{1}{7}$ and that of wife's selection

is $\frac{1}{5}$. What is the probability that :

- (i) both of them will be selected ?
- (ii) only one of them will be selected ? 7

UNIT—III

5. (A) Discuss DBMS Architecture in detail. 7
- (B) Write short notes on following with suitable examples :
 - (i) 3NF
 - (ii) BCNF. 8
6. (A) Discuss ER Model in detail. 10
- (B) Discuss the advantages of Normalization. 5

UNIT—IV

7. (A) Explain the following SQL statements with suitable examples :
 - (i) Update
 - (ii) Select
 - (iii) Insert
 - (iv) Alter. 8
- (B) Discuss TCL statements along with suitable examples. 7

Exam. Code : 103204

Subject Code : 1337

B.A./B.Sc. Semester—IV

BOTANY

(Structure, Development & Reproduction in
Flowering Plants—I)

Paper—IV A

Time Allowed—3 Hours]

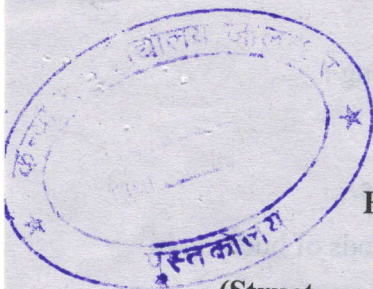
[Maximum Marks—35

Note :— (1) Question No. 1 is compulsory. Attempt all its parts. Each carries 1 mark. Restrict your answer to 3-4 lines only.

(2) Attempt any **four** questions from the remaining 8 questions (i.e. 2-9). Each carries 7 marks.

1. Attempt **all** parts. Each carries **one** mark.
 - (a) Differentiate between annual, biennial and perennial plants.
 - (b) What are fusiform and ray initials ?
 - (c) What are growth rings ?
 - (d) What is 'senescence' ?
 - (e) What is 'periderm' ?
 - (f) Define 'Kranz anatomy'.
 - (g) Differentiate between amphistomatic and epistomatic leaf.

2. Elaborate on some important differences in vascularisation of primary shoot in mono- and dicot.
3. With a neat labelled diagram, describe the internal structure of a dicot leaf.
4. Enlist various derivatives of vascular cambium. Add few lines on the role of each.
5. Differentiate between sympodial and monopodial shoot system. How does it affect the canopy architecture ?
6. Elaborate on 'Tunica-Corpus' theory of apical meristem organisation in stem. How does it differ from Apical Cell theory ?
7. Differentiate between sap and heart wood. Add a note on characteristics of growth rings.
8. Write in brief various types of adaptations in leaf in terms of water stress.
9. What is "abscission zone" ? What are the major changes observed in organs as they pass through abscission and senescence ?



Exam. Code : 103204

Subject Code : 1338

B.A./B.Sc. Semester—IV

BOTANY

(Structure, Development and Reproduction in
Flowering Plants—II)

Paper—IV B

Time Allowed—3 Hours]

[Maximum Marks—35

Note :- Question No. 1 is compulsory and answer should be restricted to **four** lines. Attempt any **FOUR** questions from remaining **EIGHT** questions. All questions carry equal marks.

1. Define/explain the following :

- (i) Triple fusion
- (ii) Cellular endosperm
- (iii) Seed dormancy
- (iv) Bisporic embryo sac
- (v) Pneumatophores
- (vi) Quiescent zone
- (vii) Antipodals.

7×1=7

- 2. With the help of labelled diagrams compare apical cell and histogen theories of root apical meristem organisation.
- 3. With the help of labelled diagrams describe the structure and function of xylem.

4. Write explanatory notes on the following :
 - (i) Modification of root for storage
 - (ii) Interaction of roots with microbes.
5. Describe advantages and various methods of budding in detail.
6. With the help of labelled diagrams describe the types of tapetum. Describe the function of different wall layers of a typical anther.
7. Give an illustrated account of development and structure of most common type of embryo sac found in angiosperms.
8. What is self incompatibility ? Discuss its significance and methods to overcome self incompatibility.
9. Write a concise account of the following :
 - (i) Strategies for dispersal of seeds
 - (ii) Seed Dormancy : its significance and physiology.

4×7=28