[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1536 A

Unique Paper Code : 42167904

Name of the Paper : Analytical Techniques in Plant Science

Name of the Course : **B.Sc. Life Sciences**

Semester : VI

Duration : 3 hours 30 minutes Maximum Marks : 75

Instructions for Candidates

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

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

   (i) Separation of molecule on the basis of difference in charge is called _____

   (ii) _____ is a technique used for separation of lipids.

P.T.O.

(iii) The two halves of a biological membrane arereferred to as the _____ and E-Half.

(iv) Mass spectrometer was invented by _____

(v) Beer's law states that the intensity of light decreases with respect to _____

(vi) The stationary phase in paper chromatography is _____

(vii) A microscope has a 4X ocular lens and a 10X objective; the microscope's total magnification is _____ X. (5×1=5)

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

(i) Svedberg unit

(ii) Half life

(iii) Stationary phase

(iv) Cryofixation

(v) Spectrophotometry

(vi) Autoradiography

(c) Match the column **(any five)** : (5×1=5)

(i) Affinity chromatography	*Taq* polymerase
(ii) ELISA	rotor
(iii) PCR	nitrocellulose membrane
(iv) Centrifuge	antigen-antibodies interaction
(v) Confocal microscope	biomolecular interaction
(vi) Blotting techniques	pin hole aperture

2. Differentiate between **(any five)** : (5×1=5)

(i) Positive and Negative Staining

(ii) Differential and density gradient centrifugation

(iii) Northern and Southern Blotting

(iv) G Banding and Q Banding

(v) GC and HPLC

(vi) Mass spectrometry and X-ray crystallography

P.T.O.

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

(i) DNA Sequencing

(ii) Marker enzymes

(iii) Ultracentrifugation

(iv) Shadow casting

4. (a) Define FISH. Give an account of the technique and its application. (7)

(b) What is autoradiography? How is it helpful in determining the site of protein synthesis and the subsequent transport of secretory proteins? Explain. (8)

5. (a) What is molecular sieve chromatography? Discuss its principle and applications. (7)

(b) What is the difference between freeze fracture and freeze etching techniques? How are they useful in understanding membrane structure? (5)

(c) Give a brief account of the phase contrast microscopy. (3)

6. (a) Explain the principle and working of UV-Visible Spectrophotometry with the help of well labelled diagram. (7)

(b) Differentiate between scanning electron microscopy and transmission electron microscopy. (8)

7. (a) Justify the following statements **(Any five)** : (5×2=10)

(i) Paraffin wax is not used as an embedding material in transmission electron microscopy.

(ii) TLC has an advantage over paper chromatography.

(iii) All the ultracentrifuges are refrigerated.

(iv) Biological materials are coated with heavy metals in scanning electron microscopy.

(v) Proteins are separated on the basis of their length of amino acid chain in SDS-PAGE.

(vi) Resolving power of a microscope is inversely proportional to the limit of resolution

(vii) Carbohydrates and lipids cannot be separated by electrophoresis.

(b) Explain the use of radioisotopes in biological research. (5)