(iii) Analytical centrifugation

(iv) Western blotting

[This question paper contains 8 printed pages.]

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)** (1×5=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 _____

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

P.T.O.

(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)

(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)

P.T.O.

(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

P.T.O.