2025

(FYUGP)

(6th Semester)

BOTANY

Paper : BCC–15BDSE–01(A) (T)

(Analytical Techniques in Plant Sciences)

Full Marks : 75 *Pass Marks* : 40%

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

UNIT—I

1. *(a)* Describe the principle of fluorescent microscopy. What are the different types of fluorescent microscopes? 10

Or

(b) Define flow cytometry. Differentiate between scanning electron microscope (SEM) and tunnelling electron microscope (TEM).

UNIT—II

2. *(a)* Differentiate between sucrose density gradient and $CsCl_2$ gradient centrifugation. 10

Or

(b) Write short notes on any *two* of the following : 5×2=10

(i) Ion-exchange chromatography

(ii) Molecular sieve chromatography

(iii) Marker enzymes

UNIT—III

3. *(a)* Describe the principle and applications of spectrophotometry in biological research. 10

Or

(b) Write short notes on any *two* of the following : 5×2=10

(i) Autoradiography

(ii) Pulse-chase experiment

(iii) Radioisotopes

UNIT—IV

4. *(a)* Describe the working principle of mass spectrometry and X-ray diffraction. 10

Or

(b) Define electrophoresis. Describe the types of electrophoretic techniques used for the characterization of proteins and nucleic acids.

UNIT—V

5. *(a)* Define biostatistics. Describe the different types of data and methods of collection of data. 10

Or

(b) Write short notes on any *two* of the following : 5×2=10

(i) Representation of data

(ii) Measures of dispersion

(iii) Chi-square test for goodness of fit

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BOTANY

Paper : BCC–15BDSE–01(A) (T)

(Analytical Techniques in Plant Sciences)

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

Put a Tick (✓) mark against the correct answer in the brackets provided : 1×15=15

1. The technique that can be used to determine the 3-dimensional structures of protein is called

(a) radioimmunoassay ( )

(b) X-ray crystallography ( )

(c) mass spectrometry ( )

(d) liquid chromatography ( )

2. When proteins are separated according to their electrophoretic mobility, then the type of electrophoresis is called

(a) SDS-PAGE ( )

(b) Affinity electrophoresis ( )

(c) free-flow electrophoresis ( )

(d) electrofocusing ( )

3. Which of the following is used for labelling cellular entities in autoradiography techniques?

(a) Glycoproteins ( )

(b) Antibodies ( )

(c) Radioisotopes ( )

(d) DAPI ( )

4. Pulse-chase experiment is related to

(a) biosynthesis ( )

(b) microscopy ( )

(c) spectrometry ( )

(d) radioactivity ( )

5. The detergent used in SDS-PAGE is

(a) Sodium dodecyl sulfate ( )

(b) Sodium dodecyl sulphur ( )

(c) Sodium disulphide ( )

(d) Sodium dichloride sulphide ( )

6. Which of the following is ***not*** among the principles of microscopy?

(a) Magnification ( )

(b) Resolving power ( )

(c) Reflective properties ( )

(d) Numerical aperture ( )

7. $n \sin \theta$ is related to

(a) eye lens ( )

(b) objective lens ( )

(c) magnification ( )

(d) numerical aperture ( )

8. Fluorescence dye used in microscopy, on excitation would produce

(a) red colour ( )

(b) yellow colour ( )

(c) yellow-green colour ( )

(d) blue colour ( )

9. Thiazine dye and eosin dye are used in

(a) G-banding ( )

(b) Q-banding ( )

(c) DAPI staining ( )

(d) chromosome staining ( )

10. FISH is

(a) Fluorescence In Site Hydrolysis ( )

(b) Fluorescence In Situ Hydrolysis ( )

(c) Fluorescent In Situ Hybrids ( )

(d) Fluorescence In Situ Hybridization ( )

11. Electron gun is a component in

(a) SEM ( )

(b) FISH ( )

(c) flow cytometry ( )

(d) confocal microscopy ( )

12. RCF in centrifugation is

(a) Relative Centripetal Force ( )

(b) Related Centripetal Force ( )

(c) Relative Centrifugal Force ( )

(d) Related Centrifugal Force ( )

13. Which of the following is used for gradient centrifugation?

(a) Sodium chloride ( )

(b) Sucrose ( )

(c) Calcium chloride ( )

(d) Sodium hydroxide ( )

14. The representation of data in the form of orderly tables is known as

(a) tabulation ( )

(b) graphical ( )

(c) dynamic ( )

(d) charts ( )

15. $\overline{X}$ is

(a) median ( )

(b) mode ( )

(c) variation ( )

(d) arithmetic mean ( )

SECTION—II

(*Marks* : 10)

Write on the following in few sentences : 2×5=10

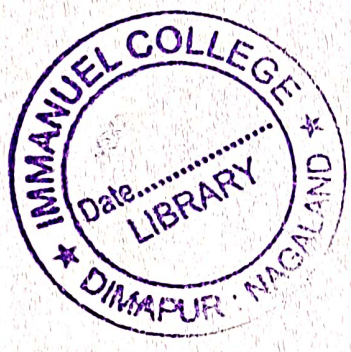
1. Chromosome banding

2. Paper chromatography

3. Uses of radioisotopes in biological research

4. AGE

5. Standard deviation



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