



Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category 'A' by MHRD (now MoE)

Re-accredited with an 'A++' Grade by NAAC CGPA 3.65/4, Category I by UGC

Coimbatore - 641 043, Tamil Nadu, India

Continuous Internal Assessment II – October 2025

SEMESTER - V

Class - III B.Sc

Branch - Botany

Time :2hrs.

Max. Marks: 60

23BBODE8–Bio-Analytical Techniques

Course Outcomes:

CO1: Develop conceptual understanding of cell wall degradation enzymes and cell fractionation.

CO2: Classify different types of chromatography techniques.

CO3: Explain the principles of Light microscopy, compound microscopy, Fluorescence microscopy and confocal microscopy

CO4: Understand the use of electron microscopy in biological science.

CO5: Apply suitable strategies in data collections and disseminating research findings

Part A

Choose the correct answer

(6 X 1= 6)

- 1 A cell population stained with both PI (red) and FITC (green) in flow cytometry indicates: **CO3K1**
(a) Viable cells only (b) Apoptotic cells only (c) Dead cells only (d) Mixed populations
- 2 Which scenario best justifies the use of flow cytometry over fluorescence microscopy? **CO3K5**
(a) Studying subcellular localization of protein (b) Counting and sorting thousands of cells in a short time
(c) Observing chromosomal structures (d) Imaging live cell dynamics in tissues
- 3 In electron microscopy, the electrons are focused using _____. **CO4K2**
(a) Glass lens (b) Magnetic lens (c) Crystal prism (d) Light lens
- 4 Which technique is used for chromosome banding? **CO4K2**
(a) Giemsa staining (b) Sudan Black (c) PAS stain (d) Iodine
- 5 The most appropriate graph for representing frequency distribution is _____. **CO5K1**
(a) Histogram (b) Pie chart (c) Line graph (d) Scatter plot
- 6 The measure of central tendency that is least affected by extreme values is _____. **CO5K2**
(a) Mean (b) Median (c) Mode (d) Range

Part B

(3 x 6=18)

Answer any two questions (Answer should not exceed 400 words)

- 7a Explain the principle and applications of fluorescence microscopy. **CO3K2**
(or)
- 7b Elucidate the applications of flow cytometry **CO3K2**
- 8a Write short notes on FISH (Fluorescence *In Situ* Hybridization). **CO4K2**
(or)
- 8b Explain the principle of chromosome painting and its biological significance. **CO4K2**
- 9a Describe the tabular and graphical methods of data representation with examples **CO5K2**
(or)
- 9b The seed pod weights (in mg) of 8 pumpkin seeds were recorded: 5.6, 5.3, 5.9, 5.5, 5.4, 5.7, 5.6, 5.3. Calculate the mean, median, and mode of plant height. **CO5K3**

Part C

(3 x 12=36)

Answer any one question (Answer should not exceed 800 words)

- 10a Explain the principle and components of fluorescence microscope with suitable diagram **CO3K3**
(or)
- 10b Explain the principle and components of flow cytometry with suitable diagram **CO3K3**
- 11a Explain the sample preparation techniques in electron microscopy (cryofixation, negative staining, freeze fracture, freeze etching). **CO4K3**
(or)
- 11b Compare and contrast TEM and Scanning Electron Microscopy (SEM) with neat diagrams. **CO4K4**
- 12a Explain the Chi-square test for goodness of fit. In a monohybrid cross the expected phenotypic ratio is 3 : 1 (dominant : recessive). In an experiment 240 offspring were obtained and classified as follows: The observed phenotype Dominant was 160 and recessive was 80. Test whether these results fit the expected 3:1 ratio **CO5K4**
(or)
- 12b Discuss the measures of central tendency and dispersion with suitable biological data. **CO5K3**