

Total number of printed pages = 7

63/1(SEM-5) DSE-1 BOTHE5016

2024

BOTANY

Paper : BOTHE5016

(Analytical Techniques in Plant Sciences)

Full Marks : 60

Pass Marks : 24

Time : 3 hours

***The figures in the margin indicate
full marks for the questions***

1. Choose the correct answer ***(any five)***:

1×5=5

- (i) Which statistical test would you use to compare more than two group means?
- (a) T-test
 - (b) Chi-square test
 - (c) ANOVA
 - (d) Correlation Coefficient.

- (ii) Which of the following is a measure of central tendency?
- (a) Standard deviation
 - (b) Mean
 - (c) Variance
 - (d) Range
- (iii) Chromatography is primarily used for which of the following purposes?
- (a) Identification of metals.
 - (b) Measuring viscosity.
 - (c) Separation of mixtures.
 - (d) Determining the pH of a Solution.
- (iv) In ion-exchange chromatography, separation of substances is based on:
- (a) Molecular weight.
 - (b) Size of molecule.
 - (c) Charge of molecule.
 - (d) Solubility.
- (v) Spectrophotometry is used to measure?
- (a) Absorption of light.

- (b) Emission of light.
 - (c) Reflection of light.
 - (d) Refraction of light.
- (vi) Which type of cuvettes are used for UV spectrophotometry?
- (a) Glass
 - (b) Plastic
 - (c) Quartz
 - (d) Metal
- (vii) Which of the following is a naturally occurring radioisotope?
- (a) Technetium-99
 - (b) uranium-238
 - (c) Iodine-131
 - (d) Strontium-90
- (viii) What is the primary purpose of cell fractionation?
- (a) To break down complex carbohydrates into simple sugars.
 - (b) To isolate and study the different organelles within a cell.

(c) To examine the genetic code of a cell.

(d) To measure the electrical activity of cells.

(ix) What is the typical magnification range of a light microscope?

(a) 1-10X

(b) 40-1000X

(c) 1000-10000X

(d) 10000-100000X

(x) Which technique is commonly used to determine the molecular weight of proteins?

(a) Southern Blot.

(b) Northern Blot.

(c) PCR

(d) SDS-PAGE

2. Answer the following questions (*any five*): $2 \times 5 = 10$

(a) What is chromosome banding?

(b) What is meant by Rf value equal to zero (0)?

(c) How Beer-Lambert law is related to spectroscopy?

(d) Define one curie?

(e) What is the difference between high speed and ultra centrifuge? $1+1=2$

(f) What is oil immersion objective? Name the Plant from where the immersion oil is extracted? $1+1=2$

(g) What is range? How to calculate it? $1+1=2$

3. Answer *any five* of the following questions : $5 \times 5 = 25$

(a) What is the difference between TEM and SEM? 5

(b) Write a note on flow cytometry (FACS) and its application in biological research. 5

(c) What is autoradiography? Explain. 5

(d) Describe the functional aspect of the different components found in spectrophotometer. 5

(e) What is electrophoresis? What are its function? $2+3=5$

(f) What is meant by Central tendency? Write the different types of Central tendency. $2+3=5$

(g) Write a note on Chi-square test of goodness of fit and its uses. $3+2=5$

(h) What is biostatistics? How primary data differs from secondary data collection?
 $1+4=5$

(i) Describe the method of sucrose density gradient centrifugation. 5

4. Answer *any two* of the following questions:
 $10 \times 2 = 20$

(a) What is a fluorescence microscope? Explain the working principle of the fluorescence microscope. Mention its application in biological research.
 $2+6+2=10$

(b) Explain the working principle of centrifugation. Write the application of centrifugation in biological research.
 $7+3=10$

(c) Write in detail about TLC (Thin Layer Chromatography). Write the advantages of TLC.
 $8+2=10$

(d) Write a note on standard deviation. What is the formula for calculating standard deviation of sample size less than 30 and if more than 30. Write the merits and demerits of standard deviation. $4+2+4=10$
