



Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd.u/s 3of 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-641043, Tamil Nadu, India

Continuous Internal Assessment I – February 2025

II Semester

Class : I UG

Major: Biochemistry and Biotechnology

23BBTC02 Bioanalytical Tools

Time : 2 hrs

Max Marks : 60

Course Outcomes :

CO1: Understand the theoretical basis for the practical experiments.

CO2: Recognize the importance of buffer systems in pH maintenance.

CO3: Appreciate the principle, operation, and applications of various techniques for analysing biomolecules.

CO4: Design suitable techniques for the separation of biomolecules.

CO5: Interpret the results of analytical techniques.

Part A

6 x 1 = 6

Choose the Correct Answer

1. Acetate buffer of pK 4.7, what is prepared by mixing 10ml of 0.1M sodium acetate and 10 ml of 0.1 M acetic acid has a pH of
a. 5.7 b. 4.7 c. 6.7 d. 3.7 CO1K3
2. Analytical ultracentrifuge differ from preparative unltracentrigue, in that it has
a. cooling system b. heating system c. Optical system d. Size reduction CO1K3
3. The lesser the concentration of salt- relative to acid, the pH of the buffer solution
a. greater than pKa b. lesser than pKa. c. equal to pKa d. not affected CO1K4
4. A mixture of acidic, neutral and basic amino acids are well separated by
a. Paper chromatography b. Affinity Chromatography CO2K3
c. Ion- exchange chromatography d. Adsorption chromatography
5. Which of the following reagent is used to locate sugars in paper chromatography?
a. 0.05% Diphenyl carbazone b. 0.2 % KMnO4 in 1% Na2CO3 CO2K2
c. 0.1% Ninhydrin solution d. 0.25% Mercuric acetate
6. Carboxy methyl cellulose is _____
a. strong anion exchanger b. weak anion exchanger CO2K2
c. weak cation exchanger d. strong cation exchanger

Part B

3 x 6 = 18

Answer ALL questions

Each answer should not exceed 400 words or two pages

7. (a) Derive Henderson-Hasselbach equation and its application.. CO1K2
(or)
7. (b) What is the pH of a phosphate buffer that contains mixture of 0.042 M NaH₂PO₄ and 0.058 M Na₂HPO₄? CO1K3
8. (a) Explain the different type of rotors and their purpose CO1K2
(or)
8. (b) i) what is RCF of a centrifuge that operates at 23000 rpm and having an r value of 5 cm? CO1K5
ii) Calculate the rpm value of a centrifuge, which is operating at an RCF of 20,000g and having an average r value of 5 cm.
9. (a) Elaborate the important steps involved in Thin layer chromatography. CO2K2
(or)
9. (b) i) The protein ovalbumin (IpH=4.6), urease (IpH=5.0) and myoglobin (IpH=7.0) were applied to the column of DEAE cellulose at pH 6.5. The column was eluted with a dilute pH6.5 buffer and then with the same buffer containing increasing concentration of sodium chloride. In what order will the protein be eluted from the column?
- ii) What do you mean by Rf value? If Rf value of an analife is zero and one what does it means? (ii) During a chromatography experiment, a pigment moved 3.4 cm, whilst the solvent had moved 4.8 cm. Calculate the Rf value. CO2K4

Part C

3 x 12 = 36

Answer ALL questions

Each answer should not exceed 800 words or four pages

10. (a) How will you determine pH by glass electrode? Explain.. CO1K2
(or)
10. (b) Discuss in detail on different types of preparative ultracentrifuge. CO1K2

11. (a) Give an account on thin layer chromatography (TLC) – Principle, procedure and applications. CO2K2

(or)

11. (b) Describe the commonly used matrix materials in column chromatography. Add a note on the types of column chromatograph based on pressure. CO2K2

12. (a) Discuss gel permeation chromatography and its application in the molecular weight determination of protein.. CO2K2

(or)

12. (b) Diagrammatically represent and explain the purification of enzyme by affinity chromatography. CO2K2

Total Number of QPs: 55 + 40