Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A++' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Arrear Examination – November 2024

II Semester

Class: 2023 batch **Time: 3 hours**
Major: Biochemistry and Biotechnology **Max. Marks: 100**

23BBTC02 Bioanalytical Tools

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

Choose the Correct Answer **10 x 1 = 10**

1. Buffer solutions resist any change in pH. This is because **CO1K2**
   a) acids and alkalis in these solutions are shielded from attack by other ions
   b) these give unionised acid or base on reaction with added acid or alkali
   c) fixed value of pH
   d) large excess of H^+ or OH^- ions

2. Differential centrifugation involves the use of **CO1K2**
   a) Different speeds b)Different times of centrifugation
   c) Different tissues d) Different speeds and different times of centrifugation

3. Paper Chromatography is a separatory technique that is used to separate **CO2K2**
   a) Simple mixtures b) Complex mixtures
   c) Viscous mixtures d) Metals

4. Ion exchange chromatography is based on **CO2K2**
   a) Electrostatic attraction b)Electrical mobility of ionic species
   c) Partition chromatography d) Adsorption chromatography

5. The sample path length and concentration of the sample are directly Proportional to the **CO3K1**
   a) Reflection of light b) Refraction of light
   c) Absorbance of the light d) Intensity of the light

6. Which part of the spectrophotometer is adjusted to select the desired wavelength? **CO3K2**
   a) Light source b) Filter
   c) Sample d) Photodetector

7. Which technique separates charged particles using electric field? **CO4K2**
   a) Hydrolysis b) Electrophoresis
   c) Protein synthesis d) Protein denaturing

8. If proteins are separated according to their electrophoretic mobility then the type of electrophoresis is: **CO4K2**
   a) SDS PAGE b) Affinity Electrophoresis
   c) Electro focusing d) Free flow electrophoresis

9. ECG (Electrocardiogram) was developed first by **CO5K2**
   a) Wilhelm His b) Steward
   c) Hubert Mann d) Willem Einthoven

10. What property of sound waves acts like the principle of ultrasound? **CO5K1**
   a) Reflection and Refraction b) Reflection only
   c) Refraction only d) Propagation

Part B

5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

11. (a) Derive Henderson-Hasselbach equation and its application.	CO1K2
(Or)	
11. (b) Convert 1500 rpm into RCF with radius of rotor as 7.5 cm.	CO1K5
12. (a)Explain briefly on separation of amino acids using ascending chromatography	CO2K1
(Or)	
12. (b) (i) What do you mean by Rf value? If Rf value of an analite 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.	CO2K5
13. (a) Write about the working principles and applications of colorimetry.	CO3K2
(Or)	
13. (b) Explain in detail about bioluminescence	CO3K2
14. (a)Write about autoradiography and its application.	CO4K2
(Or)	
14. (b)Define electrophoresis and explain about the applications of isoelectric focusing	CO4K2
15. (a) Write about PET scan and CAT scan?	CO5K1
(Or)	
15. (b)Describe about Infrared Spectroscopy	CO5K3

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

16. (a) How will you determine pH by glass electrode? Explain.	CO1K2
(Or)	
16. (b) Discuss about the density gradient centrifugation	CO1K1
17. (a) Discuss the important steps involved in TLC. Add a note on the separation of lipids using TLC.	CO2K2
(Or)	
17. (b) Give an account of the use of ion-exchange chromatography in the separation of amino acids.	CO2K2
18. (a) Derive Beer and Lamberts law and its application.	CO3K3
(Or)	
18. (b) Discuss the working principle and applications of Nephelometry.	CO3K2
19. (a) Give an account on electrophoresis,write the working principle and explain in detail about Agarose gel electrophoresis.	CO4K2
(Or)	
19. (b) Discuss in detail about radioactive isotopes and its application in biochemical research.	CO4K2
20. (a) Give an account of principle and applications of X-ray crystallography.	CO5K2
(Or)	
20. (b) What are the methods we used to image intact biological structure, explain any two in detail.	CO5K2