Registration Number:

Date & Session:

ST.JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27

B.Sc. (BIOCHEMISTRY) – V SEMESTER

SEMESTER EXAMINATION: OCTOBER 2023

(Examination conducted in November / December 2023)

BCH 5223 – Analytical Techniques in Biochemistry – 2

(For current batch students only)

Time: 2 Hours **Max Marks: 60**

This paper contains 3 printed pages and 4 parts

PART-A

Answer any eleven of the following in a word or in a sentence. [1 X 11 = 11M]

1. Name a protein with which biotin forms a stable interaction.
2. Give an example for an active site probe.
3. What is the composition of Laemmli buffer?
4. What is the role of running buffer in electrophoresis?
5. Name a radioactive isotope used in radiotherapy.
6. Give an example of an edoglycosidase.
7. What is the role of quenching in GM counter?
8. Name any enzyme that is used for carbohydrate sequencing.
9. Which technique is used to analyse the sequencing of carbohydrate.
10. What is the role of ddNTP in Sanger sequencing?
11. Mention the contribution of Frederick Sanger in the field of sequencing.
12. Write the full form of MALDI.
13. What is pyro sequencing?

PART-B

Answer any nine of the following. [2 X 9 = 18M]

14. Briefly describe the role of stacking gel in SDS-PAGE gel electrophoresis.
15. Diagrammatically represent the working principle of swinging bucket rotor used in centrifugation.
16. Name the stains used for the visualization of carbohydrates.
17. What are the different types of resins used in FPLC (Fast Protein Liquid Chromatography)?
18. What does a PET scan show?
19. Name two different probes that can be used to study (a) anabolic and (b) catabolic pathways.
20. What is the function of the exoglycosidase?
21. List the limitations of Sanger sequencing.
22. Name the reagents which are used for the cleavage of disulphide linkages during protein sequencing.
23. Name an amino acid residue acted upon by (a) pepsin and (b) cyanogen bromide.
24. List the advantages of automated sequenator.

PART-C

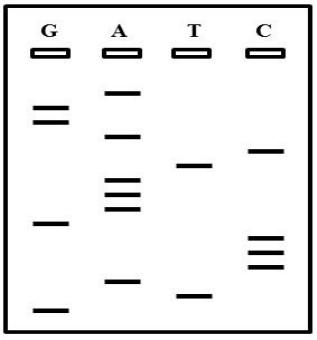
Answer any seven of the following. [3 X 7 = 21M]

25. Differentiate between native PAGE gel electrophoresis and SDS-PAGE gel electrophoresis.
26. Explain how biomolecules can be separated by 2D gel electrophoresis.
27. Briefly describe the steps involved in western blotting.
28. Differentiate between in situ hybridization (ISH) and fluorescence in situ hybridization (FISH).
29. Discuss briefly the methodology of autoradiography.
30. The half-life of a radioactive nucleus is 50 days. Calculate the time interval (t_2 - t_1). (The time t_2 when 2/3 of it has decayed and the time t_1 when it is decayed 1/3)
31. Explain briefly the protein sequencing using Edman's degradation.
32. Describe how RNA primers are synthesized in vitro.
33. Describe briefly the chemical method for the C-terminal analysis of amino acids.

PART-D

Answer any two of the following. [5 X 2 = 10M]

34. (a) Calculate the relative centrifugal force (RCF) for a centrifuge with a rotor with a spinning radius of 12 cm that is spun at 20000 revolutions per minute (RPM)?
    (b) A chromatographic analysis for the chlorinated pesticide Dieldrin gives a peak with a retention time of 8.68 min and a baseline width of 0.29 min. Calculate the number of theoretical plates? Given that the column length is 2.0 m, what is the average height of the theoretical plate in mm? (2 + 3)
35. (a) Starting from the sequencing primer, what is the sequence of the DNA sample for the following and justify your answer. (2 + 3)



(b) The following polypeptide has N-terminal F (Phenylalanine) and C-terminal T (threonine) and a total of 30 amino acids.

FVNQHLCGSHLVEALYLVCGERGFFYTPKT

(i) Calculate the rough molecular mass of polypeptide.

(ii) If the partial sequencing is done with Trypsin and Chymotrypsin together, show the digested peptide sequences.

36. (a) Predict the enzymes which will cut these bonds (1, 2 and 3) of the following complex oligosaccharide.
(b) Which technique you will use to analyse the liberated products and why? (3 + 2)