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N – 4015

Reg. No. :

Name :

First Semester B.Sc. Degree Examination, June 2022

First Degree Programme Under CBCSS

Biochemistry

Complementary Course I:

BC 1131: BIOPHYSICAL CHEMISTRY

(For Botany & Zoology)

(2020 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(very Short Answer Type – maximum **two** sentences - Answer **all** questions)

1. Give a biological application of ^{32}P isotope.
2. Mention the use of TEMED in SDS PAGE.
3. Which technique is used for the separation of DNA fragments.
4. What is Svedberg constant?
5. Mention the Function of monochromator.
6. What is UV- Visible spectrum?
7. Define an acid and a base according to Brönsted-Lowry concept.

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8. Biological importance of osmosis.
9. What is keto-enol tautomerism?
10. What is an emulsion? Give an example.

(10 × 1 = 10 Marks)

SECTION – B

(Short Answer Questions. not to exceed one paragraph – Answer **any eight** questions)

11. Discuss on Biomolecules with -CHO, -C=O and -COOH, -NH₂ groups.
12. Discuss on the principle of ion exchange chromatography.
13. What is half life? Mention any two radioactive isotopes and its biological applications.
14. What is two dimensional electrophoresis?
15. Illustrate a glycosidic bond.
16. Differentiate between molarity and normality.
17. What is a colloid? Discuss on kinetic properties of a colloid.
18. What is R_f value? Give the significance.
19. Difference between native PAGE and SDS PAGE.
20. What is an enantiomer? Give example.
21. What is osmosis and osmotic pressure? Give an application.
22. Define molarity. How will you prepare a 0.5M solution of NaCl (MW-58.44)?
23. What is buffer capacity? Give an example of a buffer.

24. Why sky appears blue? Explain the phenomenon.
25. Differentiate between hypertonic and hypotonic solutions with examples.
26. Discuss on the influence of ionization on osmotic pressure with an example.

(8 × 2 = 16 Marks)

SECTION – C

(Short essay questions - not to exceed **120** words - Answer **any six** questions.)

27. What is pKa? Discuss on the dissociation of weak acid and strong base.
28. Differentiate between lyophobic and lyophilic colloids?
29. Discuss how acid base balance is maintained in body?
30. Principle and instrumentation of spectrophotometer and its application?
31. Comment on molecular interactions in proteins
32. Explain the application, principle and instrumentation of HPLC
33. Explain the dissociation of water and derive the pH at 25°C.
34. Differentiate between osmosis and diffusion with suitable examples?
35. Explain the technique of affinity chromatography.
36. Derive Henderson-Hasselbalch equation.
37. Give an account of flow cytometry.
38. Discuss about different types of isomerism exhibited by biomolecules.

(6 × 4 = 24 Marks)

SECTION – D

(Long Essay) - Answer **any two** of the following.

39. Explain the different chromatographic techniques used in the separation of biomolecules.
40. What is Donnan membrane equilibrium and give its significance?
41. Give an account of various centrifugation techniques.
42. Explain SDS-PAGE as a suitable technique for the separation of proteins
43. Give an account of the principle and working of a pH meter.
44. Write an essay on colloids.

(2 × 15 = 30 Marks)
