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Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, August 2022.

First Degree Programme under CBCSS

Chemistry

Complementary Course for Zoology

CH 1431.4 – PHYSICAL CHEMISTRY

(2020 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **1** mark.

1. Give an example of auxochrome.
2. What is meant by Kraft's temperature?
3. Define chemical shift.
4. What is the condition for a molecule to be NMR active?
5. Define conjugate solution.
6. What is meant by conjugate acid- base pair?
7. Explain why a solution of sodium carbonate in water is basic.
8. Give the Henderson's equation for an acidic buffer.

P.T.O.

9. What is meant by zone electrophoresis?

10. What is meant by a sol?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks

11. State the Raoult's law.

12. What are the limitations of Beer-Lambert law?

13. Write a note on classification of catalysis.

14. Differentiate between hyperchromic and hyperchromic shifts.

15. What are the different types of electronic transition?

16. Calculate the pH of 10^{-5} M NaOH solution.

17. What are the factors affecting rate of a reaction?

18. Write down the Arrhenius equation and explain the terms.

19. Write any two applications of GC.

20. Define half-life period. Write down its expression for a second order reaction.

21. What is meant by Zeta potential?

22. Show that half life period of a first order reaction is independent of initial concentration.

23. Differentiate between lyophilic and lyophobic sols.

24. Discuss the advantages of Bronsted-Lowrey concept over Arrhenius concept of acids and bases.

25. What is electrodialysis?

26. Derive the relationship among K_h, K_w and K_b.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks

27. Why TMS is used as reference in NMR?

28. What is meant by Tyndall's effect?

29. What is meant by a basic buffer? Explain its mechanism of buffer action.

30. Explain the principle and applications of AAS?

31. Explain the applications of UV spectroscopy.

32. Explain briefly DTA using example.

33. Discuss the theory of fractional distillation.

34. Write down a note on HPLC.

35. Derive the integrated rate equation for a second order reaction.

36. Explain the intermediate compound formation theory of catalysis.

37. What is meant by coagulation of colloids?

38. Interpret the low resolution of NMR spectrum of

    (a) $CHBr_2CH_2Br$

    (b) CH_3CH_2Br.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks

39. Discuss the principle, instrumentation and application of FES.

40. (a) What are the postulates of collision theory of reaction rate? List any two limitations of collision theory.

    (b) Write a note on spin-spin coupling.

    (c) Differentiate between order and molecularity.

41. (a) What is meant by magnetic resonance imaging?

(b) Write a note on azeotropic mixtures.

(c) Explain any two applications of colloids.

42. (a) Explain the systems having upper, lower and upper cum lower CST using examples.

(b) Explain the cleansing action of soap.

(c) What is meant by steam distillation?

43. (a) Discuss the various types of non-ideal solutions

(b) Explain the electrical and kinetic properties of colloids

(c) Give any two applications of TO.

44. (a) Discuss in detail the various classification of colloids.

(b) Derive Henderson's equation for basic buffer.

(c) Explain the various techniques used for the purification of colloids.

(2 × 15 = 30 Marks)
