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R – 2370

Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, July 2023

First Degree Programme Under CBCSS

Chemistry

Complementary Course for Zoology

CH 1431.4 : PHYSICAL CHEMISTRY

(2017–2019 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in **one** word to maximum **two** sentences. **Each** question carries **1** mark.

1. Name one method of purification of colloids.

2. Give the conjugate bases of the following.

   (a) H_2SO_4

   (b) HNO_3

3. Calculate the pH of 0.01M HNO_3.

4. Colloid with liquid dispersed phase and solid dispersion medium is called?

5. Explain chromophore with an example.

6. The number of peaks in the NMR spectrum of $CHCl_2$-CH_2Cl.

7. What is the spin quantum number of a proton.

8. Unit of rate constant for a zero order reaction.

9. Write the selection rule for Infrared spectroscopy.

10. Example for a lyophilic colloid.

(10 × 1 = 10 Marks)

SECTION – B

Short answer type. Answer **any eight** questions from the following. **Each** question carries **2** marks.

11. Define gold number.

12. Derive the half-life of a first order reaction.

13. What is meant by electrophoresis.

14. A first order reaction with the half life time of 2 mm. Calculate the rate constant for this reaction.

15. What is Tyndall effect.

16. State and explain Henry's Law.

17. Define rate of a reaction and rate constant.

18. What are ideal and non-ideal solutions.

19. Define a Lewis acid. Give an example.

20. What is a buffer solution?

21. Write a short note on hydrolysis of salts.

22. Draw the NMR spectrum of acetone.

(8 × 2 = 16 Marks)

SECTION – C

Short essay type. Answer **any six** questions from the following. **Each** question carries **4** marks.

23. Mention the factors that affect the rate of a reaction.

24. Briefly explain the applications of coagulation of colloids.

25. Derive the relation between Kh, Kw and Ka.

26. Explain the terms chromophores and auxochromes.

27. Explain the following

    (a) Hardy-Schulze rule

    (b) Protective colloids

28. Discuss the transition state theory of reaction rate.

29. Discuss the term spin-spin coupling.

30. Briefly explain TCA taking suitable example.

31. What is meant by buffer action?

(6 × 4 = 24 Marks)

SECTION – D

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

32. (a) State and explain Henry's Law and discuss its applications.

    (b) What are the characteristics of an ideal solution? Explain the kinds of deviations observed for binary miscible liquids systems from ideal behaviour.

33. (a) Derive the Henderson's equations for acidic and basic buffer.

    (b) Briefly explain three applications of Ostwald's solution law.

34. (a) Derive the integrated rate expression for a second order reaction of the type 2A Products.

(b) Write short notes on

(i) Chemical shift.

(ii) Beer Lambert's law.

35. What are protective colloids? Explain how a lyophilic colloid can stabilize a lyophobic colloid. What is meant by delta formation?

(2 × 15 = 30 Marks)
