(Pages : 4) J – 1211

Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course for Zoology

CH 1431.4 — PHYSICAL CHEMISTRY

(2017 Admission onwards)

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. Explain the term auxochrome with an example.
2. Define the relation between pH and pOH.
3. Distinguish between lyophilic and lyophobic colloids
4. What are micelles?
5. Explain order of a reaction with example.
6. Write one example for homogeneous catalysis.
7. What is Lewis concept of acids and bases?
8. Define the term sol with an example.
9. What is the pH of 0.005M HCl solution?
10. Distinguish between ideal and non-ideal solution.

(10 × 1 = 10 Marks)

SECTION – B

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

11. Explain collision theory of reaction.

12. What is the mechanism of Buffer action?

13. What is meant by critical micelle concentration?

14. What is the term gold number?

15. Write two applications of UV spectroscopy.

16. What is zone electrophoresis?

17. What are the azeotropic mixtures? Explain with an example.

18. Explain the theory of steam distillation.

19. What is meant by critical solution temperature?

20. Explain spin-spin coupling.

21. Briefly explain hypochromic shift with example.

22. What is difference between GC and HPLC?

(8 × 2 = 16 Marks)

SECTION – C

Short answer type, Answer **any six** questions. **Each** carry **4** marks.

23. Illustrate on various factors that affect the rate of a chemical reaction.

24. (a) Why Terta methyl silane (TMS) is used as reference in NMR.

    (b) Explain δ and τ scale in NMR spectroscopy.

25. Calculate the pH of a buffer solution containing 0.2 mole of NH_4Cl and 0.1 mole NH_4OH per litre. Kb for $NH_4OH = 1.85 \times 10^5$.

26. Give an account on application of colloids.

27. Which of the following show spin-spin coupling in their NMR spectra? If coupling is observed, give the spin multiplicity

(a) $ClCH_2CH_2Cl$

(b) CH_3COCH_3

(c) CH_3CHO

(d) CH_3Cl

28. Describe various techniques for purification of colloids.

29. Illustrate on Differential Thermal Analysis (DTA).

30. Explain the principle of MRI technique.

31. Explain adsorption theory taking suitable example.

(6 × 4 = 24 Marks)

SECTION – D

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

32. (a) Explain Degree of hydrolysis

(b) Calculate the degree of hydrolysis of 0.1M solution of sodium acetate at 25°C. Ka = 1.75×10^5 and Kw = 1.8×10^{-14}.

(c) Explain the buffer action taking suitable example.

33. (a) Briefly explain the various properties of colloids

(b) Explain the protective action of colloids.

(c) Discuss methods for preparation of colloids.

34. (a) Explain the principle and applications of NMR spectroscopy.

(b) How many kinds of protons are there in following compounds and identify them.

(1) CH_3CH_3

(2) $CH_3CH = CH_2$

(3) $(CH_3)_2CHCH_2CH_3$

(4) $C_6H_5NO_2$.

(c) The salt of strong acid and strong base does not undergo hydrolysis. Explain

35. (a) Discuss the principle and applications of AAS.

(b) Explain the principle of HPLC technique.

(c) What are the factors responsible for deviation from Raoult's law?

(2 × 15 = 30 Marks)