Reg. No. : ....

Name : ....

Fourth Semester B.Sc. Degree Examination, July 2019

First Degree Programme under CBCSS

Complementary Course for Zoology

CH 1431.4 : PHYSICAL CHEMISTRY

(2017 Admn)

Time : 3 Hours   Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in 1 word to maximum 2 sentences. Each question carries 1 mark. :

1. Define the process peptization.

2. What is mean by a Sol?

3. Write an example of Bronsted acid.

4. How are τ and δ scales related?

5. What is an ideal solution?

6. What is zero order reaction?

7. What is the use of MRI?

8. Calculate the p^H of 0.001 M HCl.

9. What is the unit of rate constant of a second order reaction?

10. What is critical micelle concentration?

(10 × 1 = 10 Marks)

SECTION – B (Short answer type)

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

11. Define zeta potential and discuss its importance.

12. What is electrophoresis?

13. What is half-life of a reaction? The rate constant of a first order reaction is $3.85 \times 10^{-4}\,s^{-1}$ Calculate the half-life of that reaction.

14. Discuss the Arrhenius concept of acids and bases.

15. What are auxochromes? Give examples.

16. Define azeotropes. Give an example.

17. What are the differences between lyophilic and lyophobic colloids?

18. State and explain Raoult's law.

19. What is a catalyst?

20. Differentiate between bathochromic and hypsochromic shift.

21. What is mean by degree of hydrolysis of salts?

22. What are the applications of HPLC?

(8 × 2 = 16 Marks)

SECTION – C (Short essay type)

Answer any **six** questions from the following. Each question carries **4 marks.** :

23. Draw the vapour pressure-composition and boiling point composition curves of completely miscible binary solutions.

24. Discuss the principle and applications of thermogravimetry.

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25. Discuss the methods to calculate Arrhenius parameters.

26. Discuss spin-spin coupling in NMR taking CH_3CH_2Br as an example.

27. Find the p^H of a buffer solution containing 0.2 M CH_3COONa and 0.15 M CH_3COOH. K_a of CH_3COOH is 1.8×10^{-5}.

28. Write two methods for preparation of colloids.

29. What are the differences between order and molecularity?

30. Derive the relationship between K_h, K_w *and* K_a.

31. State and explain collission theory.

(6 × 4 = 24 Marks)

SECTION – D

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

32. (a) Explain intermediate compound formation theory of catalysis.

    (b) Discuss Tyndall effect and Brownian motion.

    (c) Identify the nuclei which are NMR active: $_1^1H$, $_2^4He$, $_7^{14}N$, $_9^{19}F$, $_6^{12}C$.

33. (a) Discuss briefly on partially miscible binary liquid systems showing upper CST, lower CST and both upper and lower CST.

    (b) Discuss the hydrolysis of NH_4Cl.

34. (a) Draw NMR spectrum of following molecules:

$$H_3C\diagdown O \qquad H_3C \diagup \overset{\overset{\displaystyle O}{\|}}{C}-O \diagdown CH_2CH_3 \qquad \langle\text{benzene}\rangle -CH_3$$
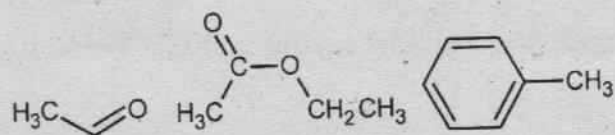
(b) Discuss briefly on electrodialysis and ultrafiltration.

35. (a) Derive the integrated rate law of first order reaction.

(b) Explain the buffer action of $CH_3COOH + CH_3COONa$ buffer solution.

(c) What are the differences between atomic absorption spectroscopy and flame emission spectroscopy?

(2 × 15 = 30 Marks)

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