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Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, July 2018
First Degree Programme under CBCSS
Complementary Course for Physics
CH 1431.1 : PHYSICAL AND INORGANIC CHEMISTRY
(2013 Admissions Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. The rate of reaction _____ with increase in temperature.
2. A chemical reaction whose rate is independent of the concentration of the reactants has order _____
3. What is the role of chlorophyll in photosynthesis occurring in plants ?
4. In the lead-silver system, Pattinson's process is used for _____
5. Benzoic acid when shaken with mixtures of benzene and water undergoes dimerisation in benzene. Suggest the modified distribution law.
6. Give an example of a bidentate ligand.
7. The number of chloride ions precipitated as AgCl from $[Co(NH_3)_6]Cl_3$ in solution is _____
8. The coordination number of the central atom in $K_3[Fe(C_2O_4)_3]$ is _____
9. The random erratic zig-zag motion of colloidal particles is called _____
10. What is electrodialysis ?

(10×1=10 Marks)

P.T.O.

SECTION – B

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

11. The rate constant of a first order disintegration of a substance is $0.5 \times 10^{-2} s^{-1}$. Calculate the time required for 10g of the substance to disintegrate to 5g.

12. Give the Arrhenius equation and explain the terms.

13. What do you mean by catalytic poison ? Give an example for a catalytic poison, giving the reaction in which it is used.

14. State Stark-Einstein law.

15. Distinguish between true equilibrium and metastable equilibrium with suitable examples.

16. Define a triple point. What is the significance of triple point in the case of the water system ?

17. Define critical solution temperature. How does it differ from miscibility temperature ?

18. What do you mean by low spin complexes ? Give an example.

19. Suggest the geometry of $[NiCl_4]^{2-}$ on the basis of valence bond theory.

20. Which among the following is more effective in coagulating the negatively charged As_2S_3 sol – Ba^{2+} or Al^{3+} ? Why ?

21. What is meant by term synerisis as applied to gel ?

22. Mention any two important applications of colloids. **(8×2=16 Marks)**

SECTION – C

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

23. Explain pseudounimolecular reaction with a suitable example.

24. Derive the integrated rate equation for a first order reaction.

25. Discuss briefly the adsorption theory of heterogeneous catalysis.

26. Sketch the phase diagram of the sulphur system and label it.

27. Explain the significance of the partition iaw in the process of solvent extraction.

28. Give the postulates of Werner's coordination theory.

29. Discuss the applications of complexes in quantitative analysis.

30. Explain the terms electrical double layer and zeta potential.

31. Write a note on micelles and their structure. **(6×4=24 Marks)**

SECTION – D

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

32. a) What are the main postulates of the collision theory of bimolecular gaseous reactions ?

    b) How does collision theory explain the effect of temperature on the rate of a reaction ?

33. Discuss the phase diagram of KI-water system. Explain the principle behind the use of freezing mixtures.

34. On the basis of Crystal field theory, account for the fact that $[CoF_6]^{3-}$ is paramagnetic while $[Co(NH_3)_6]^{3+}$ is diamagnetic.

35. Write a note on the kinetic, optical and electrical properties of colloids.

(2×15=30 Marks)