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Reg. No. : .....

Name : .....

Sixth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Chemistry

Core Course XII

CH 1643 – PHYSICAL CHEMISTRY III

(2013-16 Admissions)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. The unit of first order rate constant is ——————

2. Calculate the pH of 0.001 M HCl.

3. Explain the term order of a reaction.

4. Represent the electro chemical cell which is formed when Cu is coupled with Ag.

5. What is deliquescence?

6. Define the term Degree of freedom in phase equilibria.

7. Give an example for lower Critical Solution Temperature.

P.T.O.

8. What is congruent melting point?

9. What is the relation between change in free energy and E_{cell}?

10. What is wein effect?

(10 × 1 = 10 Marks)

SECTION – B

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

11. Derive integrated rate equation for first order reaction.

12. Define the term activation energy and explain it's significance.

13. What is leveling effect?

14. When NH_4Cl is hydrolysed what would be the resultant solution, acidic or basic? Explain.

15. What is eutectic temperature?

16. The standard reduction potential of Pb and Zn electrodes are –0.1.26 and 0.763 volts respectively. Calculate the EMF of the cell $Zn/Zn^{+2}(0.1M)||(Pb^{+2}(1M)/Pb$?

17. What is Raoult's law?

18. What is steady state method in catalysis?

19. What is the relation between ΔS and EMF of a cell?

20. What is redox electrode?

21. What is Stark-Einstein law?

22. Explain the term photosensitization.

(8 × 2 = 16 Marks)

SECTION– C

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

23. The experimental data for the reaction $2A+B_2 \rightarrow 2AB$ is as follows.

Exp. No.	[A] mol L^{-1}	[B] mol L^{-1}	Rate mol $L^{-1}s^{-1}$
1	0.50	0.50	1.6×10^{-4}
2	0.50	1.0	3.2×10^{-4}
3	1.0	1.0	3.2×10^{-4}

Write the most probable rate equation for the reaction and justify the answer.

24. In qualitative inorganic analysis, acidic medium is used in second group and basic medium is used in fourth group. Explain the reason.

25. Explain the phase diagram of sulphur system.

26. Write a note on solvent extraction.

27. Explain the working of calomel electrode.

28. Explain Meichaelis-Menten law.

29. Explain the working of H_2-O_2 fuel cell. What are it's advantages.

30. Explain qualitatively H_2-Br_2 photochemical reaction.

31. Explain conductometric titration.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions from the following. Each questions carries **15** marks.

32. What is concentration cells? Explain electrolyte concentration cell with transference and without transference.

33. (i) Derive distribution law thermodynamically and explain it's application.

    (ii) Calculate the degree of hydrolysis of 0.2 M sodium acetate solution in water. (K_a of acetic acid=1.8 x 10^{-5}; Kw=10^{-14}).

34. (i) Write down Arthenius equation and explain the terms.

    (ii) Write a note on Lindmann theory on unimolecular reaction.

35. (i) Explain conductometric titration for acid base reaction.

    (ii) Calcuate the pH of 10^{-8} M HCl.

(2 × 15 = 30 Marks)