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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

(2017 Admission)

Time : 3 Hours Max. Marks : 80

SECTION– A

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

1. Define order of a reaction.
2. What is meant by a zero order reaction?
3. Write down the relationship of K_p with K_c and K_x.
4. Write down the Henderson equation for buffer action.
5. What is the degree of hydrolysis of a salt?
6. Write down the relation between the hydrolysis constant and ionic product of water.
7. What is meant by photosensitization?

P.T.O.

8. What are non-ideal mixtures?

9. What is single electrode potential?

10. Define transport number of an ion.

(10 × 1 = 10 Marks)

SECTION – B

Answer **any 8** questions. Each questions carries **2** marks (Short answer).

11. How is molar conductance related to specific conductance?

12. Define ionic mobility.

13. What is over voltage?

14. Write down the Nernst equation for copper electrode in $CuSO_4$ solution.

15. Explain the very high quantum yield of certain photochemical reactions.

16. What are azeotropic mixtures? Give two examples.

17. Define Raoult's law. What are ideal solutions?

18. Define ionic product and solubility product of a salt.

19. Explain why the addition of non volatile solute increases the boiling point of a liquid?

20. What is chemiluminescence? Give an example.

21. Write down the Arrhenius equation and explain the terms.

22. What is Michel Menten law? Explain.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **6** questions. Each questions carries **4** marks (Short essay).

23. A solution of HCl was electrolysed using Pt electrode. The cathode compartment contains 0.1820g of HCl before electrolysis and 0.1676g after electrolysis. The weight of Ag deposited in the coulometer in series with the apparatus was 0.2525g. Calculate the transport number of H^+ and Cl^- ions?

24. Write down the Debye-Huckel-Onsager equation and explain the terms. What is it used for?

25. Derive the equation for the EMF of a concentration cell with transference.

26. Explain the principle of fractional distillation using the temperature composition diagrams.

27. Discuss the hydrolysis of salt formed from weak base and a strong acid and derive the equation for pH of that solution.

28. Discuss the phase diagram of water system.

29. Briefly explain a) opposing reactions b) first order consecutive reactions.

30. Give the construction and working of Standard hydrogen electrode.

31. What are fuel cells? Discuss the H_2-O_2 fuel cell and its cell reaction.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **2** questions. Each question carries **15** marks (Long essay).

32. Explain briefly the different types of conductometric titrations. (15 marks)

33. (a) Discuss the determination of pH using quinhydrone electrode. (6 marks)

    (b) What is distribution law? Write down the thermodynamic derivation of distribution law. (9marks)

34 Explain the different methods of determination of order of reaction. (15 marks)

35 (a) What are different laws of photochemistry, Explain. (6 marks)

(b) Explain the phase diagram of Pb-Ag system and its applications. (9 marks)

(2 × 15 = 30 Marks)
