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Sixth Semester B.Sc. Degree Examination, April 2022

First Degree Programme under CBCSS

Chemistry

Core Course XII

CH-1643 : PHYSICAL CHEMISTRY – III

(2018 & 2019 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. Write down the rate equation for second order reaction.
2. What is meant by rate law of a chemical reaction?
3. What is a dry cell?
4. What is the ionic product of water?
5. Define critical solution temperature.
6. What is phase rule and reduced phase rule?
7. Define quantum yield of a photochemical reaction.
8. What is a redox electrode? Give one example.
9. What is chemiluminescence? Give one example.
10. Draw the potentiometric titration curve for an acid and a base.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

Answer **any eight** questions. Each question carries **2** mark (Short answer).

11. What is Deby-Falkenhagen effect? Explain.
12. How is transport number related to fall in concentration of anode and cathode compartment?
13. What is liquid junction potential?
14. Write the difference between the electrochemical and electrolytic cell.
15. What is Stark-Einstein law of photochemistry?
16. What is the difference between the ideal and non ideal mixtures?
17. Define Kohlrausch's law. What is its application?
18. What is common ion effect?
19. Define Nernst Distribution law.
20. What is the effect of solvent on the ionic strength?
21. What is meant by the steady state approximation?
22. What is eutectic point and triple point in the phase diagram?
23. Explain Michaelis-Menten Law.
24. Write down the Arrhenius equation and explain the terms. What is it used for?
25. Explain the effect of solvent on ionic strength.
26. What are the limitations of distribution law?

(8 × 2 = 16 Marks)

SECTION – C

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

27. Explain the moving boundary method for determination of transport number.
28. How do you determine the hydrolysis constant of a salt by E M F measurements?

29. Explain the different methods of prevention of corrosion.

30. Discuss the photochemical reaction of H_2 and Cl_2.

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

32. Discuss the phase diagram of Pb-Ag system and its applications.

33. Briefly explain

    (a) opposing reactions

    (b) first order consecutive reactions.

34. Give the construction and working of saturated calomel electrode.

35. How distribution law is used to study association and dissociation molecules?

36. Derive the integrated rate equation for n^{th} order reaction.

37. Explain over voltage and polarization.

38. Give the thermodynamic derivation of distribution law.

(6 × 4 = 24 Marks)

SECTION – D

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

39. Explain the application of potential measurements. **15**

40. (a) Discuss the working of hydrogen- oxygen fuel cell. **6**

    (b) Explain the determination of transport number by Hittorff's method. **9**

41. Explain the different types of conductometric titrations. **15**

42. (a) Discuss the different theories of catalysis. **6**

    (b) Explain the phase diagram of $FeCl_3$ – water system and its applications. **9**

43. What is Le-Chatelier's principle? Explain its application in Haber process and dissocation of PCl_5.

44. Explain the Potentiometric titration of acid-base and redox reactions.

(2 × 15 = 30 Marks)
