(Pages : 3) **E – 1650**

Reg. No. : .....

Name : .....

Sixth Semester B.Sc. Degree Examination, April 2018
First Degree Programme under CBCSS
Chemistry
Core Course – XII
CH 1643 – PHYSICAL CHEMISTRY – III
(2013 Admission Onwards)

Time : 3 Hours Max. Marks : 80

All Saints' College Trivandrum

SECTION – A

Answer **all** questions. Answer in **one** word to maximum **two** sentences. **Each** question carries **one** mark.

1. For the reaction A + B → Products, it is observed that on doubling the concentration of A only the rate of the reaction is doubled and also on doubling the concentration of B only the rate of the reaction is doubled. What is the rate equation ?
2. What is an acidic buffer ?
3. Explain the term half life of a reaction.
4. What is ionic product of water ?
5. What is efflorescence ?
6. Define the term components in phase equilibria.
7. Give an example for upper critical solution temperature.
8. What is Azeotropic mixture ?
9. The standard reduction potential of 3 elements are given below. Which of the following is the most suitable reducible agent ? i) – 3.04 V ii) – 1.90 V iii) 1.90 V.
10. What is Kohlrausch's law ?

(10×1=10 Marks)

P.T.O.

SECTION – B

Short answer type. Answer **any 8** questions from the following. **Each** question carries **two** marks.

11. Calculate the pH of :
    a) 0.03 N H_2SO_4
    b) 0.03 M H_2SO_4
12. Define consecutive and parallel reaction.
13. Explain solubility product with an example.
14. Derive the relation between Kp and Kc.
15. Explain the terms :
    i) Triple point
    ii) Eutectic point.
16. What is Phase rule ? Explain the terms.
17. Explain the principle of steam distillation.
18. Explain intermediate compound formation theory in catalysis.
19. What is Nernst equation ? Explain the terms.
20. What is Debye-Falkenhagen effect ?
21. What is Beer-Lambert law ?
22. Explain the terms :
    i) Fluorescence
    ii) Phosphorescence.

(8×2=16 Marks

All Saints' College Trivandrum

SECTION – C

Short essay type. Answer **any 6** questions from the following. **Each** question carries **four** marks.

23. The half life of first order decomposition of Nitramide is 2.1 hour at 150 °C. $NH_2NO_{2(aq)} \rightarrow 2N_2O_{(g)} + H_2O_{(l)}$ if 6.2 gm of NH_2NO_2 is allowed to decompose. Find the time taken for nitramide to decompose 99 % ?

24. Derive the relation between Kh, Kw and Ka for the hydrolysis of salt of a weak acid and strong base.

25. Explain the phase diagram of water system.

26. State and explain Nernst Distribution law.

27. Write a note on anion reversible cells.

28. Explain the working of quinhydron electrode.

29. Explain Michaelis-Menten law.

30. Explain the determination of transport number by Hittorf's method.

31. Define quantum yield. Explain the reason for very high and low quantum yields. **(6×4=24 Marks)**

SECTION – D

Answer **any 2** questions from the following. **Each** question carries **15** marks.

32. Explain different methods to determine the order of reaction.

33. Derive Clausius – Clapeyron equation and explain its application.

34. i) Explain the working of $H_2 - O_2$ fuell cell. What are its advantages ?
    ii) Explain qualitatively $H_2 - Cl_2$ photochemical reaction.

35. i) Explain potentiometric titration for acid base and redox reaction.
    ii) A buffer solution contains 0.2 mole of NH_4OH and 0.5 mole of NH_4Cl per litre. Calculate the pH of the solution. The dissociation constant of NH_4OH is 1.8×10^{-5}. **(2×15=30 Marks)**

All Saints' College Trivandrum