MAR IVANIOS COLLEGE (AUTONOMOUS)
THIRUVANANTHAPURAM

Reg. No. :..................... Name :.....................

Sixth Semester B.Sc. Degree Examination, April 2018
First Degree Programme under CBCSS
Core Course: Chemistry – IX
AUCH643: Physical Chemistry – III
(*Common for **Regular** – 2015 and **Reappearance** – 2014 Admn.*)

Time: 3 Hours Max. Marks: 80

SECTION – A

*Answer **ALL** questions in a word or one or two sentences.*

1. What is meant by a pseudo unimolecular reaction?
2. Distinguish between order and molecularity of a reaction.
3. Define Debye- Falkenhagen effect.
4. State Stark-Einstein law.
5. What is meant by photosensitization?
6. What is leveling effect?
7. Define CST. Explain the effect of impurities on the CST.
8. Write the Michaelis Menten equation and explain the terms.
9. What is meant by reference electrode?
10. What is liquid junction potential?

$(10 \times 1 = 10$ Marks)

SECTION – B

*Answer any **EIGHT** questions, not exceeding a paragraph.*

11. Derive the integrated rate equation for a first order reaction.
12. The rate of reaction is doubled when the temperature is increased from $27°C$ to $37°C$. Calculate the activation energy of the reaction.
13. Calculate the pH of a solution obtained by mixing 800ml of 0.05 M HCl and 200ml of 0.1 M NaOH.
14. What is meant by buffer action? Explain with an example.
15. Explain the term 'congruent melting point'. Give an example of a binary condensed system involving formation of a compound with congruent melting point.

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16. Discuss the principle of steam distillation.
17. What are azeotropes? Explain with an example.
18. Discuss the intermediate compound formation theory of catalysis
19. In the electrochemical cell Cu | Cu^{2+} (0.25 M) || Ag$^+$ (0.6 M) | Ag, at 298 K, given E^o Cu^{2+}/ Cu is 0.34 V and E^o Ag$^+$/Ag is 0.80 V. Calculate the EMF of the cell.
20. Explain the principle of redox indicator.
21. State and explain Kohlrausch law.
22. Define quantum yield of a photochemical reaction. Explain the reason for the high quantum yield for the hydrogen- chlorine reaction.

$(8 \times 2 = 16 \text{ Marks})$

SECTION – C

*Short essay type : Answer any **SIX** questions.*

23. Describe any two methods for the determination of the order of the reaction.
24. Explain with examples parallel and consecutive reactions.
25. Derive the relationship between Kp and Kc.
26. Discuss the application of the principles of common ion effect and solubility product in inorganic qualitative analysis.
27. Discuss the Pattinson's method for the desilverisation of lead.
28. Explain the significance of the partition law in the process of solvent extraction.
29. What are fuel cells? Explain the working of H$_2$-O$_2$ fuel cell.
30. Sketch and explain the conductometric titration curves for a) Strong acid- weak base titration and b) Weak acid- weak base titration.
31. Describe the Hittorf's method of determination of transport number.

$(6 \times 4 = 24 \text{ Marks})$

SECTION – D

*Long essay type : Answer any **TWO** questions.*

32. a) Discuss the conditions of collision Theory (3)
    b) Derive the rate equation for a second order reaction based on collision theory. (12)
33. a) State phase rule and explain the terms. (3)
    b) Discuss the phase diagram of sulphur system. (12)
34. Write detailed notes on any four applications of EMF measurement.
35. State and explain a) Fluorescence b) Phosphorescence c) Chemiluminescence.

$(2 \times 15 = 30 \text{ Marks})$