

Reg. No

Name

18P3633

MSc DEGREE END SEMESTER EXAMINATION - OCTOBER 2018
SEMESTER 3 : CHEMISTRY / PHARMACEUTICAL CHEMISTRY
COURSE : 16P3CHET11 / 16P3CPHT11 : PHYSICAL CHEMISTRY - III
(For Regular - 2017 Admission & Supplementary - 2016 Admission)

Time : Three Hours

Max. Marks: 75

Section A

Answer any 10 (2 marks each)

1. The quantum yield of $\text{H}_2\text{-Cl}_2$ reaction is very high. Explain.
2. Give the essential of the vibrational approach to the CTST
3. What is the action of promoters in a catalysis?
4. Write a note on the influence of pH on catalytic reactions
5. How Arrhenius correlate conductance ratio with degree of dissociation of electrolytes ? What are the limitations of the theory ?
6. Explain Chemiluminescence with an example.
7. A certain photochemical reaction requires an activation energy of 30 kcal mol^{-1} . To what value does this correspond to the following units? (i) kJ mol^{-1} (ii) Wavelength
8. The compound $\text{CH}_3\text{-CH=CH-CHO}$ has a strong absorption in the ultraviolet at $46,950 \text{ cm}^{-1}$ and a weak absorption at $30,000 \text{ cm}^{-1}$. Justify these features in terms of the structure of the molecule.
9. Explain the term 'concentration quenching'.
10. Explain electro endosmosis.
11. Give the meaning of Dorn effect?
12. Define CMC.
13. Explain the electrical phenomenon which arises due to a nondiffusible ion across a semi permeable membrane. **(2 x 10 = 20)**

Section B

(Answer any 5 questions by attempting not more than 3 questions from each of the following bunches) **(5 marks each)**

Bunch I (Short Essay Type)

14. Describe the mechanism of secondary salt effect in a reaction where acetic acid ionisation provides H^+ ions to catalyse the reaction.
15. Write a note on the photodimerisation of anthracene.

16. Explain the working principles of Solar cells
17. Explain the principle of SEM in the study of surfaces

Bunch II (Problem Type)

18. For a homogeneous gaseous reaction, the rate constants are $3.0 \times 10^{-5} \text{ L mol}^{-1} \text{ s}^{-1}$ and $1.2 \times 10^{-3} \text{ L mol}^{-1} \text{ s}^{-1}$ at 629K and 700K respectively. Calculate the energy of activation and Frequency parameter.
19. The first order isomerisation of an organic compound at 130°C , the activation energy is 108.4 kJ/ mol and the rate constant is $9.12 \times 10^{-4} \text{ s}^{-1}$. Calculate the standard energy of activation and standard enthalpy of activation
20. Calculate the mean ionic activity coefficient of a 0.010 m aqueous solution of CuSO_4 at 298 K
21. Radiation of wavelength 2500 \AA is passed through a cell containing 10 ml of solution which is 0.05 M in oxalic acid and 0.01 M in Uranyl sulphate. After absorption of 80 J of radiation energy, the concentration of oxalic acid is reduced to 0.04 M. Calculate the quantum yield for the decomposition.

(5 x 5 = 25)

Section C

Answer any 2 (15 marks each)

22. (a) What are the assumptions of Transition state theory? Following the theory derive an equation for rate constant using the translational approach.
(b) Compare transition state theory with collision theory.
23. Derive Michaelis- Menton equation and discuss the effect of temperature and pressure on Enzyme catalysis?
24. There are evidences to support the formation of ion pairs and triple ions in more concentrated solutions of electrolytes. Give all details of Bjerrum theory of ion association
25. Derive the BET adsorption isotherm. Show that it approximate to Langmuir under limiting conditions

(15 x 2 = 30)