B.Tech. Third Semester (Polymer (Plastic) Tech.) (CCS)

11096 : Applied Physical Chemistry : 3 PP 02

P. Pages : 2

Time : Three Hours

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AW - 3000

Max. Marks : 80

Notes :
1. Answer **three** question from Section A and **three** question from Section B.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Diagrams and chemical equations should be given wherever necessary.
5. Illustrate your answer necessary with the help of neat sketches.
6. Discuss the reaction, mechanism wherever necessary.
7. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Explain the effects of polymer structure on the properties of polymers.   4

    b) What do you mean by intrinsically conducting polymers.   4

    c) How molecular weight of macromolecule is determine by light scattering method.   5

OR

2. a) State the principle of membrane osmometry method.   5

    b) Give the applications of Doped conducting polymers.   4

    c) Give the nomenclature for macromolecules.   4

3. a) Derive an expression for EMF of concentration cell with transference.   5

    b) Give the applications of conductometric titrations.   4

    c) Define the terms :   4
       i) Cell constant.   ii) Transport number.

OR

4. a) Explain the determination of activity and activity coefficient.   5

    b) Explain Debye - Huckel's theory of strong electrolyte.   4

    c) Define the terms :   4
       i) Specific conductance.   ii) Equivalent conductance.

5. a) Explain law of mass action.   4

    b) Give the detailed account on any two methods for determination of order of reactions.   6

    c) Define :   4
       i) K_P ii) K_C

OR

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6. a) Give an expression for collision theory of unimolecular reactions. How does the rate of any 6
with concentration of reacting molecule.

b) Why does reaction rate increases with temperature. 4

c) Show that $T_{1/2} \propto a$: for second order reaction. 4

SECTION - B

7. a) Explain Bi - Cd system with phase diagram. 5

b) Differentiate Homogeneous and Heterogeneous Catalysis. 4

c) Explain the idea of Acid - base catalysis. 4

OR

8. a) Derive the expression for Gibb's phase rule. 5

b) Explain the characteristic of catalyst. 4

c) Define : 4
   i) Catalytic activator   ii) Degree of freedom

9. a) Derive an expression for the efficiency of Carnot's engine working between two 6
temperature T_1 and T_2.

b) Give any two statements of second law of thermodynamics. 4

c) Explain the terms : 4
   i) Free energy   ii) Entropy

OR

10. a) State and explain the thermodynamic terms. 6

b) Discuss thermodynamic temperature scale. 4

c) State and explain the thermodynamic criteria for the spontaneous process taking place in 4
an isolated system at constant temperature and at constant pressure.

11. a) Derive expression for Lamberts - Beer's law. 5

b) Explain differential thermal analysis technique of polymer (DTA). 4

c) Give the applications of IR spectroscopy. 4

OR

12. a) Define : 4
   i) Quantum efficiency   ii) Photosensitization

b) Give the applications of NMR - Spectroscopy. 4

c) Explain Thermal Gravimetric Analysis (TGA) technique of polymer. 5

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