Reg. No. | | | | | | | | | |

CH 504

III Semester M.Sc. Degree Examination, December 2018
(CBCS) (Old Syllabus)
CHEMISTRY
(2015 Batch) (Repeaters)
Electrochemistry and Polymers

Time : 3 Hours Max. Marks : 70

***Note** : i) Answer Part – **A** and **any five** questions from Part – **B**.*
*ii) Figures to the **right** indicate marks.*

PART – A

Answer **any ten** subdivisions. **(10×2=20)**

1. a) Define "Differential Capacitance". How is it determined ?
   b) What is electrocatalysis ? List the characteristics of a good electro catalyst.
   c) What are the limitations of Born model of ion-solvent interactions ?
   d) What is a fuel cell ? How does it differ from a battery ?
   e) List the characteristics of ionic liquids.
   f) Mention the advantages of replacing Zn by Mg in Laclanche Cell.
   g) Define the following terms :
      i) functionality of a monomer
      ii) degree of polymerization.
   h) What are copolymers ? Mention the different types.
   i) Differentiate between branched and network polymers.
   j) Write the structure of repeating units in the following polymers :
      i) polycarbonates
      ii) polyurethanes.
   k) Give structural criteria for the polymer to exhibit electrical conductivity. Mention 2 examples of such polymers.
   l) Give the importance of TGA analysis of a polymer sample.

P.T.O.

PART – B

Answer **any five** questions : **(10×5=50)**

2. a) Discuss the thermodynamics of electrified interphases. **6**

   b) Explain 'Contact Adsorption' and its influence on the capacity of an interphase. **4**

3. a) Give a comparative account of Helmholtz – Perrin and Guoy-Chapman modes of electrified interface. **7**

   b) Discuss the compressibility method of determination of solvation number. **3**

4. a) Describe the design and working of an alkaline secondary battery. **5**

   b) Define 'overvoltage'. Explain the different types. **5**

5. a) Discuss the kinetics of electrode reactions and obtain the Butler-Volmer Equation. **6**

   b) Write notes on Hole model of liquid electrolytes. **4**

6. a) Give a detailed account of classification of polymers. **5**

   b) Discuss the kinetics of copolymerization and obtain the copolymer equation. **5**

7. a) Give a comparative account of solution and emulsion techniques of polymerization. **6**

   b) Discuss the kinetics of cationic polymerization and obtain expression for the overall rate of polymerization. **4**

8. a) What are stereoregular polymers ? How are they made ? **6**

   b) Outline the principle of osmometric method of determination of molecular weight of polymers. **4**

9. a) How are the thermal transitions correlated with the molecular structure of polymers ? Explain with examples. **6**

   b) Discuss the preparation and applications of the following :

      i) Polyesters

      ii) Polyamides. **4**

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