This question paper contains 3 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **1845**

Unique Paper Code : **217683** **E**

Name of the Paper : **Polymer Science [EL-310(ii)]**

Name of the Course : **B.Sc. (Prog.) Applied Physical Science**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *six* questions in all.

Question No. 1 is compulsory.

1. (A) Differentiate between the following types of polymer (with suitable examples) : 2×3

   (*i*) Linear polymer and crosslinked polymer

   (*ii*) Addition polymer and Condensation polymer.

   (B) Give the chemical representation and important uses of the following polymers : 3×2

   (*i*) Teflon

   (*ii*) Bakelite

   (*iii*) Nylon. 6.

   (C) What do you understand by functionality for polymer formation ? 3

P.T.O.

2. (A) How will you prepare Polyvinyl chloride (PVC) ? Give its properties as well as their uses. 2,3,3

(B) What are Ziegler-Natta catalysts ? Write their advantages. 2,2

3. (A) Show that the benzoyl peroxide initiation of styrene for polystyrene formation follows the below given kinetic scheme : 8

$$R_p = k_p(K_d/K_t)^{1/2}(f[I])^{1/2}[M].$$

(B) The polymerization between equimolar amounts of diol and diacid proceeds with the 0.931 extent of reaction (p). What will be the expected degree of polymerization if the reaction is carried out in a closed system without the removal of the byproduct water ? 4

4. (A) Define Glass Transition Temperature (T_g) of polymer. 2

(B) Describe the Free Volume Theory for the determination of T_g of polymers. 5

(C) Discuss the factors affecting T_g. 5

5. (A) Discuss the Weight Average Molecular Weight $(M\bar{w})$ in case of polymers. 2

(B) Briefly describe the determination of molecular weight by viscometric method. 6

(C) How will you prepare Polycarbonates ? Give its important uses. 4

6. (A) What is Crystalline melting point ? What are the factors affecting it ? 6

(B) Explain the conditions for the polymer to be soluble in a particular solvent. 2

(C) How will you prepare Nylon-6, 6 ? Give its important uses. 4

7. (A) What are the elastomers ? Explain with suitable examples. 4

(B) Discuss the thermodynamics criteria for polymerization process. 4

(C) Give preparation of Polythiophene and its use. 4

8. Write short notes on any *three* of the following : 3×4

(A) Silicone polymer

(B) Polydispersity Index

(C) Upper Critical Solution Temperature

(D) Application of Polystyrene.