

B. TECH.**THEORY EXAMINATION (SEM-IV) 2016-17**
POLYMER SCIENCE & TECHNOLOGY**Time : 3 Hours****Max. Marks : 100****Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.****SECTION – A**

- 1. Attempt all parts of the following questions:** **10 x 2 = 20**
- a) What are cross linked polymers and branched polymers.
 - b) What do you understand by tacticity in polymers ?.
 - c) What are degree of polymerization and functionality ?
 - d) Write the structure of repeating units in ABS polymers.
 - e) Explain, why the T_g is greater for polymers with high mol. wt. in comparison to the low mol. wt. polymers.
 - f) Give the reason, why does the elastic behaviour of PVC decrease with the inclusion of impurity ?
 - g) What are inhibitor? Give its significance.
 - h) Differentiate between condensation and addition polymerization.
 - i) What are alternate co-polymers & Graft co-polymers ?
 - j) Polytetrafluoro ethylene is a thermoplastic but behaves like a thermoset polymer, explain.

SECTION – B

- 2. Attempt any five parts of the following questions:** **5 x 10 = 50**
- a) What are elastomers. Describe preparation, properties and applications of SBR (Buna – S).
 - b)
 - (i) What are initiators? Show addition polymerization through the generation of free radicals by the decomposition of benzoyl peroxide.
 - (ii) A polymer sample consists of 10% by weight of macromolecules of molecular weight 10000 and 90% by weight of macromolecules with M. Wt. 1,00,000. Calculate the average M_n and average M_w .
 - c)
 - (i) Describe in detail the polymer Emulsion polymerisation.
 - (ii) Calculate the number average degree of polymerization of an equimolecular mixture of hexamethylene diamine and adipic acid for the extent of reaction 0.500, 0.800, 0.900, 0.950, 0.970, 0.990 and 0.995.
 - d) Discuss the kinetics of free radical polymerization. Obtain expression for degree of polymerization.
 - e) What are high performance polymers? Give the preparation, properties and applications of PMMA & PC.
 - f) What are composite polymers? Give any two methods for the processing of composite polymers.
 - g)
 - (i) Discuss the mechanism for condensation polymerization.
 - (ii) 104 gm of styrene was polymerized by radical polymerization process and D_p was found to be 1000. Calculate the number of molecules of polystyrene produced.

- h) What is Ziegler Natta Catalyst. Give the mechanism of co-ordination polymerization. What is the significance of it over free radical polymerization.

OR

Classify the polymer on the basis of:

- | | |
|------------------------|------------------------|
| (i) Origin | (ii) Ultimate form |
| (iii) Stereoregularity | (iv) Thermal Behaviour |

SECTION – C

Attempt any two questions of the following:

2 x 15 = 30

3. Differentiate between:
 - (i) Thermosetting and Thermoplastic polymer
 - (ii) Suspension and Emulsion Polymerization
 - (iii) Buna-S and Buna-N
4. Discuss in detail: (Any three)
 - (i) Vulcanization
 - (ii) Polyamides
 - (iii) Phenol Formaldehyde
 - (iv) Applications of polymers in bio-medical and space
5.
 - (i) What are the effects of polymer structure on its properties?
 - (ii) Explain the preparation, properties and important properties of PVA
 - (iii) Factors affecting the Glass Transition Temperature