

III B.Tech. II Semester Regular Examinations, April/May -2005

POLYMER ENGINEERING

(Chemical Engineering)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Differentiate between synthetic and natural rubbers. Give two examples for each.
(b) What are the derivatives of proteins?
2. Write the classification of polymers based on mode of formation and explain briefly each mode with suitable example.
3. Explain briefly various methods used for the measurement of molecular weight and its distribution
4. (a) What are non-chain scission reactions? Explain briefly.
(b) What is mastication? Explain briefly.
5. (a) Write short notes on the selection of stabilizer for a given polymers.
(b) Explain briefly about Antiozonants.
6. What are the various methods for production of polyethylene? Explain any production process processes with neat sketch.
7. (a) Compare the properties of phenolic compounds with those of urea formaldehyde product.
(b) Explain the cross linking of phenolic resins.
8. Compare compression and injection moulding for speed, investment cost and feasibility in types of materials that can be handled .

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1. (a) Define degree of polymerization, repeat unit, mesomer, free radical.
(b) Write short notes on texture of polymers.
2. What are the steps involved in free radical polymerization and explain briefly each step.
3. Describe gel permeation chromatograph method to determine molecular weight distribution of polymers.
4. Discuss in detail about the mechanical degradation of polymers.
5. Write short notes on important features of additives and explain briefly each feature.
6. (a) Write short notes on stability of PVC and its applications.
(b) Write short notes on structure and applications of PTFE.
7. (a) State the monomers used to make polyurethanes? Write the polymer structure.
(b) Describe the applications of polyurethane fibers.
8. (a) Explain briefly pultrusion with neat sketch.
(b) Write short notes on laminating.

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1. (a) Write few reasons why cost of the plastic materials decreasing.
(b) Discuss briefly, why demand for plastic materials is increasing?
2. Write chemical equations for the following reactions in the benzoyl peroxide initiated polymerization of vinyl chloride: initiation, propagation, termination by combination and by disproportionation, transfer to monomer and to polymer.
3. (a) Differentiate between glass transition temperature and flow temperature.
(b) Write the equations which relates molecular weight and glass transition temperature.
(c) Explain Dilatometer with neat sketch to measure the various transitions, which will occur in polymers.
4. Discuss the factors favoring cross linking and degradation in the effect of ionizing radiation on polymers.
5. (a) Write short notes on the selection of stabilizer for a given polymers.
(b) Explain briefly about Antiozonants.
6. (a) Differentiate between HDPE and LDPE.
(b) Describe any one method for the manufacture of HDPE.
7. What is PMMA and also write structure, monomers, polymerization reaction conditions, properties along with applications.
8. (a) Describe the various sections of an extruder screw indicating the purpose of each one.
(b) Write short notes on blow molding.

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1. (a) Write few reasons why cost of the plastic materials decreasing.
(b) Discuss briefly, why demand for plastic materials is increasing?
2. (a) What is equal reactivity hypothesis? Explain.
(b) Using the equal reactivity hypothesis, explain the kinetics of step growth polymerization.
3. Describe gel permeation chromatograph method to determine molecular weight distribution of polymers.
4. Explain
 - (a) Dipole forces
 - (b) induction forces
 - (c) dispersion forces
 - (d) Hydrogen bonding forces
5. What are the structural modifications which changes with time and why these modifications will occur. How to prevent these modifications?
6. (a) Write short notes on stability of PVC and its applications.
(b) Write short notes on structure and applications of PTFE.
7. What is PMMA and also write structure, monomers, polymerization reaction conditions, properties along with applications.
8. Compare compression and injection moulding for speed, investment cost and feasibility in types of materials that can be handled .
