Code No: RR320806 **Set No. 1**

**III B.Tech II Semester Supplimentary Examinations, Apr/May 2008**
**POLYMER ENGINEERING**
**(Chemical Engineering)**

**Time: 3 hours** **Max Marks: 80**

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

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1. (a) Differentiate between synthetic and natural rubbers. Give two examples for each.
   (b) What are the derivatives of proteins? [8+8]
2. What are the steps involved in free radical polymerization and explain briefly each step. [16]
3. (a) Describe briefly Ubbelhode viscometer with neat sketch.
   (b) Write Mark-Hounik equations and also explain its use for the estimation of polymer molecular weight. [8+8]
4. Discuss in detail about the mechanical degradation of polymers. [16]
5. Discuss the use of plastizers to improve and tailor polymer properties. [16]
6. (a) Write and explain method of cross-linking of polyethylene.
   (b) Write the reaction conditions, chemicals used to produce HDPE. [8+8]
7. (a) Describe the processing of phenolic molding materials of different forms for applications.
   (b) State the monomers and cross-linking agents employed to make phenol compounds. [8+8]
8. Compare compression and injection moulding for speed, investment cost and feasibility in types of materials that can be handled. [16]

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Code No: RR320806 **Set No. 2**

**III B.Tech II Semester Supplimentary Examinations, Apr/May 2008**
**POLYMER ENGINEERING**
**(Chemical Engineering)**

**Time: 3 hours** **Max Marks: 80**

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

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1. Discuss the occurrence, chemical composition, method of extraction and application of wood and silk. [16]

2. Discuss methods of controlling the heat evolved in vinyl polymerization, comparing the merits of bulk, solution, suspension, and emulsion polymerization and of the use of batch, tubular, and stirred-tank reactors. [16]

3. (a) If light scattering and osmotic pressure are measured in the same solvent for the estimation of molecular weight, compare the slopes of the plots of 1/M versus C.
   (b) What type of ultra centrifugation experiments are suitable for the random coil polymers. [8+8]

4. Explain various properties based on which a polymer is said to have "a good chemical resistance". [16]

5. Explain briefly the selection of solvent for given polymer. Also discuss briefly about solubility parameters and few common solvents used in the plastic industry. [16]

6. High-pressure polymerization of ethylene leads to low-density polyethylene. Substantiate the above statement giving the production conditions and process flow chart. [16]

7. (a) What are the various monomers employed to prepare unsaturated polyesters.
   (b) Explain the cross-linking process in unsaturated polyesters. [8+8]

8. Compare compression and injection moulding for speed, investment cost and feasibility in types of materials that can be handled. [16]

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Code No: RR320806 **Set No. 3**

**III B.Tech II Semester Supplimentary Examinations, Apr/May 2008**
**POLYMER ENGINEERING**
**(Chemical Engineering)**

**Time: 3 hours** **Max Marks: 80**

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

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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? [8+8]
2. Write kinetic equations for initiate radical chain polymerization showing :
   (a) how rate is related to concentrations of initiator, radicals, and monomer
   (b) how degree of polymerization is related to the same quantities. [8+8]
3. Write the expressions for different average molecular weights. Discuss the membrane osmometry method for the determination of molecular weight of high polymers. What are the advantages and limitations. [16]
4. (a) Write short notes on chain end degradation.
   (b) Explain briefly about random degradation.
   (c) In some cases polymer degradation is advantageous. Explain with example. [6+5+5]
5. Explain briefly about the necessity of flame-retardants in polymers mainly emphases their function in polymers. [16]
6. (a) Write short notes on the method of production of polypropylene.
   (b) Write various structural forms of polypropylene. [10+6]
7. (a) What are the raw materials used for the production of polyurethane? Also write chemical equations for the polymerization as practiced industrially.
   (b) What are the advantages of melamine formaldehyde powders over urea formaldehyde powders? [8+8]
8. What are moulding techniques? Describe any two moulding techniques. [16]

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Code No: RR320806 **Set No. 4**

**III B.Tech II Semester Supplimentary Examinations, Apr/May 2008**
**POLYMER ENGINEERING**
**(Chemical Engineering)**

**Time: 3 hours** **Max Marks: 80**

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

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1. (a) Write short notes on production of casein plastics
   (b) Explain briefly about the natural polymer of rosin. [8+8]
2. Which of the following monomers would you expect to polymerize readily by a free-radical mechanism? why?
   $CH_2 = C(CH_3)_2, CH_2 = CHCH_3, CH_2 = CHCH = CH_2$ [16]
3. Define Glass transition temperature and explain briefly various methods for the estimation of glass transition temperature. [16]
4. (a) Explain briefly about thermal degradation.
   (b) What are the factors that will affect the C-C bond stability? Explain with example. [8+8]
5. Write short notes on important features of additives and explain briefly each feature. [16]
6. Explain the Ziegular process for the production of polyethylene. [16]
7. What are the raw materials required to make phenol- formaldehyde resins? Explain the process involved to produce the monomers. [16]
8. Describe the blow molding and blown film adhesion processes indicating where orientation takes place. [16]

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