Code No: R05320805 **Set No. 1**

III B.Tech II Semester Regular Examinations, Apr/May 2008
POLYMER TECHNOLOGY
(Chemical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (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]
2. (a) Write short notes on proteins. [8+8]
   (b) What are natural polymers? Also, give the differences between naturally occurring low molecular weight substances and natural polymers?
3. What are the steps involved in free radical polymerization and explain briefly each step? [16]
4. Define and describe micelles and discuss their role in emulsion polymerization?[16]
5. What is initiation and write few common initiators used in plastic industry along with their structures. [16]
6. (a) What are the additives that can be used to alter the polymer properties of PTFE.
   (b) Explain briefly preparation method of monomer for the production of polystyrene. [6+10]
7. (a) Describe the manufacture of PET with a flow sheet. Write the reaction equations for the two stages in the formation of the polymer.
   (b) What are the uses of the polymer? Write about its general properties. [10+6]
8. (a) What is extrusion? What are the different types of extrusions and explain briefly each of them
   (b) Explain calendaring process with suitable example. [8+8]

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Code No: R05320805 **Set No. 2**

III B.Tech II Semester Regular Examinations, Apr/May 2008
POLYMER TECHNOLOGY
(Chemical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (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]

2. (a) Write short notes on proteins. [8+8]
   (b) What are natural polymers? Also, give the differences between naturally occurring low molecular weight substances and natural polymers?

3. 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]

4. Discuss causes for the initiation of, and methods for preventing, random degradation and chain depolymerization? [16]

5. (a) What are the three main types of lubricants used in polymer processing? Explain the function of each of them with examples.
   (b) What are the various types of antioxidants? Explain the action of each type with examples. [8+8]

6. (a) Describe the manufacture of polymethylmethacylate by bulk polymerization process.
   (b) What are the various products made from the PMMA. Write about the general properties of the polymer. [10+6]

7. What are the raw materials required to make phenol- formaldehyde resins? Explain the process involved to produce the monomers. [16]

8. (a) What is extrusion? What are the different types of extrusions and explain briefly each of them
   (b) Explain calendaring process with suitable example. [8+8]

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Code No: R05320805 **Set No. 3**

III B.Tech II Semester Regular Examinations, Apr/May 2008
POLYMER TECHNOLOGY
(Chemical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain [4×4]
   (a) Osmotic pressure
   (b) Polymer blend
   (c) Poly dispersivity index
   (d) Frictional coefficient?
2. (a) How the manufacturing methods and the physical properties of the proteins differ form polyamides? [10+6]
   (b) Write few examples of proteins and their applications?
3. Write chemical equations for the major steps in the polymerization of the following [5+5+6]
   (a) Isobutylene by stannic chloride
   (b) Styrene by sodium naphthalene
   (c) Ethylene by titanium tetrachloride and diethyl aluminum chloride
4. Define Glass transition temperature and explain briefly various methods for the estimation of glass transition temperature? [16]
5. (a) Write short notes on Antioxidants.
   (b) Write short notes on stabilizers. [8+8]
6. (a) Explain the preparation of polyvinyl acetate from its monomer. Write about its properties and uses.
   (b) How is polyvinyl alcohol prepared? Write the reaction equation. What are its uses? [8+8]
7. (a) What are the various routes by which polycarbonate is prepared?
   (b) Describe the manufacture of the polymer by any one of the methods along with the reaction equation and reaction conditions. What are the applications of the polymer? [4+12]
8. (a) Discuss the blow molding process of polymers with neat sketches of each of the stages. Name the products made by the process.
   (b) Explain the calendering process with a neat sketch. [10+6]

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Code No: R05320805 **Set No. 4**

III B.Tech II Semester Regular Examinations, Apr/May 2008
POLYMER TECHNOLOGY
(Chemical Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Describe sedimentation transport method for the estimation of molecular weight of polymers along with relevant equations? [16]
2. Write a detailed note on the following? [8+8]
   (a) Natural Rubber
   (b) Rosin
3. Write the distinguishing features of chain-and step polymerization [16]
4. Explain briefly: [8+8]
   (a) Emulsion polymerization
   (b) Suspension polymerization
5. (a) What do you understand by degradation of polymers? Explain the two mechanisms of degradation with examples.
   (b) Why is it required to incorporate additives in polymers before processing?
   (c) Explain the following characteristics of additives:
      i. Bleeding
      ii. Blooming. [6+4+6]
6. (a) State the differences between properties and manufacturing conditions of HDPE & LDPE.
   (b) Explain the manufacture of LDPE clearly with a flow sheet. Mention the temperature, pressure and catalyst in the reactor. [4+12]
7. (a) Describe the process of curing polyurethanes to give polyurethanes rubbers.
   (b) Explain the uses of polyurethanes foams and fibers. How polyurethanes fibers are compared with polyester fibers. [8+8]
8. (a) Explain the compression molding process with a diagram. For what type of polymers is it used?
   (b) What are the advantages of transfer molding over compression molding. Explain the transfer molding process with a figure. [8+8]

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