Code No: 07A7EC31 **R07** **Set No. 2**

IV B.Tech I Semester Examinations,MAY 2011
POLYMERIC METERIALS
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Give an account of the commercially important thermosetting resins based on formaldehyde raw material highlighting their method of preparation, properties and applications. [16]

2. Discuss the properties and applications of both natural, vulcanized and synthetic rubbers. [16]

3. (a) Explain the basic physical, mechanical and thermal properties of thermosets.
   (b) What are the first thermosetting materials used by plastic industry? Explain about them.
   (c) Explain about condensation polymerization. [8+4+4]

4. (a) Explain the production of ethylene by the following processes.
      i. Hydrogenation of acetylene
      ii. Dehydration of ethanol
      iii. By cracking of petroleum products.
   (b) Explain the various methods of increasing the strength of ethylene. [9+7]

5. Write short notes:
   (a) Characteristics and applications of injection molding
   (b) Laminating process. [8+8]

6. What is step polymerization? Explain different types of step polymerization techniques. [16]

7. (a) How do you generalize the concepts of two averaging methods to determine either number-average molecular weight or weight-average molecular weight? Explain.
   (b) Explain any one method of average molecular weight of a polymer. [10+6]

8. (a) What are Bakelite resins? Explain its functioning in the production of polymers?
   (b) What is cross-linking? What are its advantages? Which materials are for cross-linking purpose? [8+8]

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Code No: 07A7EC31 **R07** **Set No. 4**

IV B.Tech I Semester Examinations,MAY 2011
POLYMERIC METERIALS
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain about the following type of acetals.
   i. Homopolar acetals
   ii. Copolymer acetals.
   (b) Give the properties and uses of the above acetals. [10+6]
2. (a) Distinguish between
   i. Step growth and
   ii. Chain growth polymerization process.
   (b) Describe the shapes that can be made extrusion process. Why? Explain.
   (c) How is size of an injection molding machine designated? What are the common sizes. In what from the plastic is used in the process. [8+4+4]
3. (a) Define colligative property. List out different types of colligative properties.
   (b) How does the molecular weight of a polymer be determined by Osmometry method? [6+10]
4. (a) Bring out the differences between the following
   i. Buna-S & Buna-N.
   ii. Polyurethane rubber & silicone rubber.
   (b) Why are the synthetic rubbers becoming more and more popular? Explain. [10+6]
5. (a) What is the mechanism of inhibition and retardation?
   (b) Explain the kinetics of inhibition and retardation. [8+8]
6. List out different types of polymerization techniques. Discuss in detail any two techniques. [16]
7. Discuss the following
   (a) Characteristics and applications of calendaring process
   (b) Process parameters of blow molding. [8+8]
8. With the help of neat sketches explain the following. Also write the advantages and limitations of each of these processes for the production of polymers.
   (a) Injection molding process

(b) Extrusion molding process. [8+8]

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Code No: 07A7EC31 **R07** **Set No. 1**

IV B.Tech I Semester Examinations,MAY 2011
POLYMERIC METERIALS
Metallurgy And Material Technology

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 the following
   i. Phenol-formaldehyde resin
   ii. Functionality of a monomer.
   (b) What is a parting line? Explain. Where it will be located on an injection molded article. Explain. [10+6]
2. (a) Explain the principle of calendaring operation with a neat sketch of sequence of operations.
   (b) Explain compression moulding process adopted for thermosetting materials. [8+8]
3. Write a brief note on:
   (a) Relaxation and retardation
   (b) Colorants in the processing of polymers. [8+8]
4. (a) Define and give mathematical expressions for the following:
   i. Inherent viscosity
   ii. Specific viscosity
   iii. Limiting viscosity.
   (b) State the Mark-Houwink equation and discuss how would apply this equation for the determination of molecular weight of a polymer. [9+7]
5. Explain about nylon 6,9; nylon 6,10 and nylon 6,12 with respect it processing, properties and applications. [16]
6. (a) What is chain polymerization? Explain.
   (b) Explain chemical structures of the following: Potassium persulphate, Methyl ethyl ketone peroxide, Peracetic acid, Perbenzoic acid. [8+8]
7. (a) Sketch and explain the mer structure of Buna rubber. What is the major limitations of Buna rubber? What are its important applications.
   (b) On the basis of structure, how elastomers are different from other long chain polymers. Explain.
   (c) State the advantages & disadvantages of reclaimed rubbers. [8+4+4]

8. (a) With the help of a flow chart explain the manufacture of low density polyethylene.
   (b) Describe the relation between long chain branching and molecular weight distribution, typical to low density polyethylene.
   (c) Explain why is polyvinylchloride scrap is reuseable while bakelite scrap is useless. [7+5+4]

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Code No: 07A7EC31 **R07** **Set No. 3**

IV B.Tech I Semester Examinations,MAY 2011
POLYMERIC METERIALS
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the products made by transfer molding? What would they have in common that would be different from compression molded articles?
   (b) Explain the characteristics and applications of cold molding process.
   (c) How can patterns be impressed in the calendered sheet? [6+6+4]
2. (a) What is the effect of weight of a polymer on its glass transition temperature? Discuss
   (b) How does the glass transition temperature of a polymer related to its melting point?
   (c) Explain the significance of glass transition temperature.
   (d) Show that osmatic pressure depends on number of molecules per unit volume. [8+4+4]
3. (a) What are the major advantages and disadvantages of thermosetting plastics.
   (b) What are the usual processes by which thermosetting plastics are processed? Explain briefly their working principle. [8+8]
4. (a) Sketch the mer structures of LDPE & HDPE and explain them in detail.
   (b) Write short notes on the following
      i. Expanded Polystyrene
      ii. Teflon. [6+10]
5. (a) What are photo degradients? Explain its effects in the use of polymers with examples.
   (b) What are Inhibitors? Explain the effects of inhibitors in polymers with an example. [8+8]
6. (a) Explain the behavioural differences between a polymer like polyvinyl alcohol and a low molecular weight compound such as sodium chloride.
   (b) Explain the processes of polymerisaion with suitable examples. [6+10]
7. (a) Give the flow chart for the production of nylon yarn and explain the process.
   (b) Explain briefly about the following
      i. Nylon II
      ii. Nylon 9. [10+6]

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8. (a) Buna-S-rubber or butadiene-styrene copolymer is produced by what kind of polymerization process? Explain. Give the equation.
   (b) What are elastomers? What kind of structure rubbers have? Discuss.
   (c) What is a silicone elastomer? What is the chemical structure unit for the silicones? Explain. [6+5+5]

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