

# 17341

**14115**

**3 Hours / 100 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Answer each next main Question on a new page.  
(3) Illustrate your answers with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Assume suitable data, if necessary.

**Marks**

- 1. Answer any FIVE of the following:** **20**
- a) Explain the terms:
    - (i) polymer
    - (ii) degree of polymerisation.
  - b) Write the basic requirements of fibre forming polymer.
  - c) What is flame retardant polyester? How is it manufactured?
  - d) Write two physical properties and two end uses of nylon 6 fibre.
  - e) Give the chemical reaction involved in polyester fibre, manufacture. Classify polyester as:
    - (i) addition/condensation
    - (ii) thermoplastic/thermoset
  - f) What are modacrylic fibres? Enlist the monomers and comonomers used in modacrylic fibre manufacture.
  - g) Enlist four end uses of carbon fibres.

P.T.O.

**2. Answer any FOUR of the following:****16**

- a) Explain essential requirements of melt spinning.
- b) Explain the concept of high speed spinning process.
- c) With a neat sketch, explain the function of extruder in melt spinning equipment.
- d) State advantages of TPA process over DMT process.
- e) Define: hallow fibres. Explain use of polyester hollow fibre.
- f) Define the term microfibre. Give merits and demerits of microfibres.

**3. Answer any FOUR of the following:****16**

- a) With a neat sketch, explain formation of a fibre structure in melt spinning.
- b) Show the sequence of polymer flow in melt spinning. State the function of manifold.
- c) Describe the terms:
  - (i) HOY
  - (ii) POYand mention spinning speed required for manufacturing.
- d) Describe raw material synthesis of polyester fibre.
- e) What is CDPET? Which modifications are done during polymerisation of CDPET? Enlist the additives added for manufacturing CDPET.
- f) Write the chemical structure of raw materials used for nylon 6.6 fibre. Also show chemical reaction for polymerisation. How is the forward reactions favoured?

- 4. Answer any FOUR of the following:** **16**
- a) What are steps involved in manufacturing nylon 6 fibre? Describe the polymerisation process of nylon 6.
  - b) What is differentially dyeable nylon? Which changes are required in manufacturing process for getting differentially dyeable nylon?
  - c) What is pilling? How are low pilling nylons manufactured?
  - d) Give two physical properties and two end uses of nylon 6.6 fibre.
  - e) How is flame retardancy introduced in acrylic fibres?
  - f) Explain as to why melt spinning of acrylic fibre is not possible.
- 5. Answer any FOUR of the following:** **16**
- a) Differentiate between nylon 6 and nylon 6.6 fibre on the basis of their properties.
  - b) Describe addition polymerisation process of acrylic fibre.
  - c) Give two physical properties and two end uses of acrylic fibre.
  - d) Define bicomponent fibres. Explain their use.
  - e) Differentiate between LDPE and HDPE fibres.
  - f) Explain manufacturing of carbon fibre by any one route.
- 6. Answer any FOUR of the following:** **16**
- a) Explain solidification process in melt spinning.
  - b) State advantages of hydrophilic nylons. How are they manufactured?
  - c) Describe manufacturing process of glass fibres.
  - d) Give the chemical structure of lycra fibre. State its end uses.
  - e) Give two chemical properties and two end uses of polypropylene fibre.
  - f) Write industrial applications of glass fibres.
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