

**B.TECH DEGREE EXAMINATIONS: APRIL/MAY 2014**

(Regulation 2009)

Sixth Semester

**TEXTILE TECHNOLOGY**

TTX117: High Performance Fibres

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

- \_\_\_\_\_ is fibre in which the chain molecules are highly oriented along the fibre axis, so the strength of the chemical bond is exploited.
  - Nomex
  - HPPE
  - Polyamide
  - Polyester
- \_\_\_\_\_ are used for producing "bullet proof" body armor fabric.
  - Meta-aramids
  - Para-aramids
  - Mesophase-aramids
  - Ortho-aramids
- Carbon fibers derived from Polyacrylonitrile (PAN) are \_\_\_\_\_.
  - graphitic
  - Both graphitic and turbostratic
  - turbostratic
  - Hybrid
- AR-Glass is \_\_\_\_\_ resistant glass.
  - Abrasion
  - Alkali
  - Acid
  - Air
- Ceramics generally can withstand very high temperatures that range from \_\_\_\_\_.
  - 100 °C to 160 °C
  - 3000 °C to 3600 °C
  - 300 °C to 360 °C
  - 1000 °C to 1600 °C
- \_\_\_\_\_ is a copolymer of high molecular weight with poly tetra methylene glycol as soft segment and diphenylmethane-4,4'-diisocyanate or toluene-2, 4-diisocyanate as hard segment.
  - Spandex
  - Anidex
  - Ceramic
  - PBI
- \_\_\_\_\_ has exceptional thermal and chemical stability and does not readily ignite.
  - PBT
  - PBO
  - PBI
  - Anidex
- \_\_\_\_\_ is an electrical insulator but has a relatively high thermal conductivity.
  - PBI
  - PPS

- Al<sub>2</sub>O<sub>3</sub>
  - Lead
- \_\_\_\_\_ is mostly preferred for protective packagings and bottles.
    - PLA
    - Silica
    - Polystyrene
    - Optical
  - \_\_\_\_\_ is thermoplastic aliphatic polyester derived from renewable resources, such as corn starch or tapioca roots or starch or sugarcane.
    - Polystyrene
    - PLA
    - PET
    - PGA

**PART B (10 x 2 = 20 Marks)**

- Draw the structure of Para-aramid.
- List any four properties of steel fibres.
- How do you enhance the tensile strength and modulus of elasticity of carbon fibre?
- Enumerate the merits and demerits of glass fibre.
- What is "Reaction Spinning"?
- Mention the applications of Polybenzimidazole (PBI) fibre.
- Why Sulphur based fibre is mostly preferred in battery separators?
- Draw the structure of Lead fibre.
- How split microfiber fabrics provide best results during cleaning?
- Mention any two techniques used producing nanofibres.

**PART C (5 x 14 = 70 Marks)**

- Enumerate the various requirements of high performance fibres. (5)
  - Explain briefly the polymer preparation and fibre formation process of Meta-aramid fibre. (9)

**(OR)**

  - List the properties and applications of Para-aramid and Meta-aramid fibres. (5)
    - Elaborate the fibre formation process of Steel fibre. Also mention the product development areas of steel fibres. (9)
- Classify the Carbon fibres. (4)
    - Explain briefly the manufacturing process of PAN based Carbon fibre. (10)

**(OR)**

  - Give the composition of E-glass and S-glass. (5)
    - Explain briefly the manufacturing process of Glass fibre. (9)

23. a) (i) Elaborate the manufacturing process of Polyurethane fibre. (9)  
(ii) Enumerate the properties and applications of Ceramic fibre. (5)  
**(OR)**
- b) (i) List the various applications of elastomeric fibres. (4)  
(ii) Explain briefly the fibre formation process of Polybenzimidazole (PBI). (10)
24. a) (i) Explain briefly the fibre formation process of Polyphenyl Sulphide (PPS) fibres. (10)  
(ii) Give the chemical structure of Polyphenyl Sulphide (PPS). (4)  
**(OR)**
- b) (i) Explain briefly the preparation and manufacturing process of Aluminium Oxide fibres. (10)  
(ii) Why the lead fibre is preferred in sound control and radiation shielding materials? (4)
25. a) (i) Elaborate the preparation and properties of Polystyrene based fibres. (7)  
(ii) Elaborate the properties and applications of bio-absorbable fibres from cotton, rayon and Poly Lactic Acid (PLA). (7)  
**(OR)**
- b) (i) Mention the properties and applications of Hollow fibres. (7)  
(ii) Elaborate the manufacturing process of silica fibres. (7)

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