



B.TECH DEGREE EXAMINATIONS: DEC 2022

(Regulation 2018)

Fifth Semester

B.TECH TEXTILE TECHNOLOGY

U18TXE0002: High Performance Fibers

COURSE OUTCOMES

CO1: Discuss the aramid and sulphur based fibres.

CO2: Explain the fundamentals, manufacturing, properties, and applications of carbon and glass fibres.

CO3: Differentiate the structure, manufacturing methods, properties, and applications of ceramic, elastomeric, and PBI fibres.

CO4: Demonstrate about the various aspects of metallic fibres.

CO5: Describe about the newly developed fibres.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|---|-----|-------------------|
| 1. Differentiate between p-aramid and m-aramid fibre. | CO1 | [K ₂] |
| 2. Interpret the properties of nomex fibre and its applications. | CO1 | [K ₃] |
| 3. State the purpose of the stabilization process involved in carbon fibre production. | CO2 | [K ₁] |
| 4. Classify the different types of glass fibres and their applications. | CO2 | [K ₂] |
| 5. Resolve the two-stage reaction process involved in the synthesis of PBI polymer. | CO3 | [K ₂] |
| 6. Interpret the change in the tensile strength of the Silicon carbide fibres made by CVD techniques at very high temperatures. | CO3 | [K ₃] |
| 7. Indicate the physical and chemical properties of aluminium oxide fibres. | CO4 | [K ₂] |
| 8. "Is the lead sheet have a characteristic and is used as sound insulator materials" Justify the statement | CO4 | [K ₄] |
| 9. Draw the flow process of preparing the polystyrene-based ion exchange fiber. | CO5 | [K ₃] |
| 10. Summarize the properties necessary for the polymer to act as biomedical materials. | CO5 | [K ₂] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

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|-----|----|--|----|-----|-------------------|
| 11. | a) | Explain the manufacture of para-aramid fibre under the dry jet wet spinning and the properties of aramid fibres with reference to fibre structure, fibre properties, and thermal properties. | 12 | CO1 | [K ₂] |
| | b) | Comparison between aromatic polyamides and copolyamides. | 4 | CO1 | [K ₄] |
| 12. | a) | Discuss the purpose and manufacturing methods of producing pitch-based carbon fibres with a neat sketch. | 8 | CO2 | [K ₂] |
| | b) | Explain the direct melt process for the production of continuous filaments of glass fibres with a neat sketch. | 8 | CO2 | [K ₂] |
| 13. | a) | Describe the manufacturing processes of alumina-silica fibres with examples. | 8 | CO3 | [K ₂] |
| | b) | Examine the types, properties, production, and applications of polyurethane fibres. | 8 | CO3 | [K ₄] |
| 14. | a) | Explain the manufacturing processes of aluminium oxide fibres with examples. | 10 | CO4 | [K ₂] |
| | b) | Determine the purpose of lead fibre used as a radiation shielding material at nuclear power stations with examples. | 6 | CO4 | [K ₄] |
| 15. | a) | Classify polystyrene-based fibres based on functional application. Examine two approaches involved in the preparation of polystyrene-based fibres with examples. | 8 | CO5 | [K ₄] |
| | b) | Determine the salient features of absorbable and nonabsorbable sutures used for surgical applications. | 8 | CO5 | [K ₄] |
| 16. | a) | Discuss in detail the gel spinning process for the manufacture of high-density polyethylene fibres (HDPE) with a neat sketch. | 10 | CO3 | [K ₂] |
| | b) | Interpret the five major continuous steps involved in tow finishing of Polybenzimidazole (PBI) fibre formation. | 6 | CO3 | [K ₃] |
