Register Number:……..

KUMARAGURU
college of technology
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M.TECH DEGREE EXAMINATIONS: NOV/ DEC 2024

(Regulation 2024)

First Semester

TECHNICAL TEXTILES

24TXT503: Fibres and Yarns for Technical Textile

COURSE OUTCOMES

CO1: Analyze chemically and thermally resistant fibers to distinguish their properties and applications.
CO2: Evaluate the properties and applications of HMHT and metallic fibers to recommend suitable uses in technical textiles.
CO3: Compare sulfur-based, elastomeric, and PBI fibers to assess their suitability for various technical applications.
CO4: Create hybrid yarns and advanced composites to demonstrate their potential applications in technical textiles.
CO5: Develop mathematical models for technical yarns to optimize their design and functionality using computer-aided design systems.

Time: Three Hours **Maximum Marks: 100**

PART A (4*20 = 80 Marks)
Answer All Questions

1.	a)	Compare PTFE and PVF fibers in terms of structure, properties, and applications.	4	CO1	[K_2]
	b)	Infer chlorinated fibers, and what are the key properties and applications of PVC fibers.	4	CO1	[K_2]
	c)	Explain the structure, properties, and applications of Poly ether ether ketones (PEEK) and Polyetherimide (PEI) in high-performance materials.	12	CO1	[K_5]
2.		Scenario: You are part of a research team in a textile engineering lab working on developing advanced materials for high-strength and heat-resistant applications. Your focus is on understanding thermoset polymers, aromatic polyamides, polyaramids, and semi-carbon fibers derived from oxidized acrylics. The team aims to explore their structural properties, manufacturing processes, and applications in aerospace, protective gear, and thermal insulation industries.			

	a)	Summarize the synthesis, structural characteristics, and key properties of aromatic polyamides and polyaramids.	4	CO2	[K_2]
	b)	Compare and contrast the mechanical and thermal properties of thermoset polymers, and polyaramids.	4	CO2	[K_2]
	c)	Develop the semi-carbon fibers from oxidized acrylics. Discuss their properties and suitability as precursors for carbon fibers and in thermal insulation applications.	12	CO2	[K_3]
3.	a)	Organize the properties and applications of Poly Phenyl Sulphide (PPS) fiber.	4	CO3	[K_3]
	b)	Conclude the structure of Elastomeric fibres.	4	CO3	[K_5]
	c)	Examine the fibre formation, structure, properties, and applications of (Polybenzimidazole) PBI fiber.	12	CO3	[K_4]
4.	a)	Classify the different types of hybrid yarns and their uses.	4	CO4	[K_4]
	b)	Choose the techniques used for manufacturing Shape Memory Polymers (SMPs).	4	CO4	[K_3]
	c)	Apply the suitable manufacturing process, properties and applications of glass, and ceramic fibres.	12	CO4	[K_3]

Answer any ONE Question
PART B (1*20 = 20 Marks)

5.	a)	Analyze the role of 3D computer graphics and visualization technologies in designing and analyzing cloth and yarn structures.	10	CO5	[K_4]
	b)	Explain the importance of mathematical modeling in understanding the structures of yarns and fancy yarns.	10	CO5	[K_5]

OR

6.	a)	Inference the components and functionalities of a Computer-Aided Design (CAD) system for designing yarn and fancy yarn structures.	10	CO5	[K_4]
	b)	Explain the significance of fancy yarns in the textile industry and explain how CAD systems aid in their innovation.	10	CO5	[K_5]

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