Register Number:……..

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

(Regulation 2024)

First Semester

COMMON TO FT / TXT

24CYI105 : Textile and Apparel Chemistry

COURSE OUTCOMES

CO1: Apply polymerization mechanisms to solve challenges in developing novel polymers for textile applications.

CO2: Analyse the effects of polymer structures on material properties to distinguish between various polymer-based textile products.

CO3: Apply different polymer processing techniques to solve challenges in textile manufacturing processes.

CO4: Apply sustainable materials and chemical additives in textile production processes to develop eco-friendly textile products

CO5: Interpret the interaction between dyes and fibers to optimize dyeing processes for various fabric types, ensuring efficiency and sustainability

CO6: Evaluate and recommend water treatment processes and recycling strategies to address the environmental challenges of the textile industry

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

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

1.	a)	What is polymer functionality? Explain its importance in polymer synthesis.	2	CO1	[K_1]
	b)	Differentiate between condensation and addition polymerization with examples.	2	CO1	[K_2]

	c)	**Scenario:** A research lab is tasked with developing polymers that degrade naturally in the environment without releasing toxic by-products. Based on the scenario, suggest and describe a polymerization process suitable for synthesizing biodegradable polymers and justify your recommendation.	6	CO1	[K_2]
	d)	Analyze the impact of polymer chain structure on its degradation properties in natural environments.	6	CO2	[K_3]
	e)	Propose a testing methodology to evaluate the environmental safety of the biodegradable polymer.	4	CO1	[K_3]
2.	a)	What is injection molding? Explain its application in the textile industry.	2	CO3	[K_1]
	b)	Differentiate between blow molding and extrusion molding in polymer processing.	2	CO3	[K_2]
	c)	Explain with its advantages fiber spinning techniques in the production of advanced textiles.	8	CO3	[K_2]
	d)	Discuss the role of crosslinking agents and anti - oxidants in improving polymer performance for textile applications.	8	CO3	[K_3]
3.	a)	Define "auxochrome" and describe its function in dyes.	2	CO5	[K_1]
	b)	Explain the concept of hypochromic and bathochromic effects with examples.	2	CO5	[K_2]
	c)	Analyze how chemical bonding between dyes and fibers impacts dye retention.	8	CO5	[K_2]
	d)	Propose strategies to minimize the environmental impact of synthetic dye production.	8	CO5	[K_3]
4	a)	What are the disadvantages of using untreated hard water in textile industries?	2	CO6	[K_1]
	b)	Discuss the role of colloidal conditioning in water treatment.	2	CO6	[K_2]
	c)	Explain the advantages of electrodialysis over conventional water treatment methods for textile industries.	4	CO6	[K_3]
	d)	Evaluate the use of demineralization technique in maintaining water quality in textile manufacturing processes.	12	CO6	[K_3]

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

5.	a)	Define the term "green chemistry" and explain its role in textile processing.	2	CO4	[K_1]
	b)	Discuss the significance of carbon nanotubes in enhancing the properties of sustainable textiles.	2	CO4	[K_2]
	c)	Explain how solvent-free processing techniques reduce environmental impact in textile production.	8	CO4	[K_3]
	d)	Evaluate the use of recycled textile waste in producing new, eco-friendly fabric products.	8	CO4	[K_3]

OR

6.	a)	Define bio-based polymers and explain their significance in sustainable textile development.	2	CO4	[K_1]
	b)	Discuss the importance of nanofibers in creating high-performance textiles.	2	CO4	[K_2]
	c)	Explain how polylactic acid (PLA) contributes to sustainable textile applications.	8	CO4	[K_3]
	d)	Evaluate the role of eco-friendly finishing techniques in reducing the environmental footprint of textiles.	8	CO4	[K_3]

CO distribution summary:

	CO1	CO2	CO3	CO4	CO5	CO6
Marks (%)	14	06	20	20	20	20

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