

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BTECH
BRANCH: CHEMICAL ENGINEERING**

**SEMESTER : VII
SESSION : MO/2025**

SUBJECT: CL421 FIBRE SCIENCE AND TECHNOLOGY

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Elaborate the manufacturing process of Carbon fibre and draw the flow chart.	[2+3]	1 2
Q.1(b)	Compare between NYLON66 and Acrylic fibres in respect to chemical structure, manufacturing process, mechanical properties, solubility and crystallinity.	[5]	2 3
Q.2(a)	Draw the melt spinning line and show the various steps of the process. Describe the various spin finishes used on fibres produced by melt spinning. Give examples of various spin finishes.	[3+3]	2 1
Q.2(b)	Calculate the filament temperature (Tx) for denier 126/36 at take up speed 3200m/minute for a distance of 1.5 meter from the spinneret. Reynold's number =0.63, Prandtl Number =0.7 and C =0.99, m=0.33	[4]	2 2
Q.3(a)	Describe the limitation of wet spinning of acrylic fibres. Name the solvent and nonsolvent used for acrylic fibre manufacturing.	[1+2]	3 2
Q.3(b)	Derive the expression of "spin stretch " for wet spinning. Write down about the methods of texturing and its usefulness.	[3+4]	3 3
Q.4(a)	Draw the XRD patterns for crystalline, amorphous and semicrystalline polymers. Give examples of such materials.	[4]	4 2
Q.4(b)	Draw the schematic diagram of TEM and describe the procedure of experiment.	[3+3]	4 3
Q.5(a)	Write down the composition of VAT Dyes and describe the method of it's production. List down the advantages and limitations of this dye.	[2+2+2]	5 3
Q.5(b)	Define: yarn, felts, lace tufting, flocked fabric	[4]	5 3

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