

Model Question Paper-1/2 with effect from 2022-23 (CBCS Scheme)

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Fourth Semester B.E. Degree Examination
TEXTILE FIBRE PHYSICS

TIME: 03 Hours

Max. Marks: 100

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	Marks
Q.01	a	With the help of a line diagram equations and graphs Explain how percent crystallinity (K) crystalline orientation function(f_c) and crystal size (L_{hkl}) are determined using WAXS	L2	10
	b	One cm ³ of fibre with 80% crystallinity by volume has dimensions of 15A° x 15A° x 10A° Find the number of crystals present. If the crystal has 10 repeat units of molecular weight 136, determine density (g/cm ³) of crystalline region (Avogadro number $N=6.023 \times 10^{23}$)	L3	10
OR				
Q.02	a	Briefly explain how density crystallinity of fibre is found using DGC and state any 4 disadvantages of DGC.	L2	10
	b	State the role the role of TEM and SEM in analyzing the fine structural details of fibres.	L1	10
Module-2				
Q. 03	a	With the help of neat figure, explain structural (physical) features of cotton fibre.		10
	b	Draw the crystal unit of N-6, molecular structure of PET, repeat unit of silk and cotton arrangement of molecules in PAN and gross structure of wool fibres.		10
OR				
Q.04	a	Show that $S_v = S_A + S_L + S_A + S_L$ and $S_A = S_d^2 + 2S_d$ with respect to moisture swelling of fibres and also give reason for anisotropic swelling behavior of textile fibres.	L3	10
	b	Give the relation between MR and MC. If 100gm of oven dry weight of a textile fibre absorbs 4.5 CC of moisture, determine MR and MC of in fibre and predict the name of this fibre and also name the fibres which has MR ten times less than this fibre and two times (approximately) more than this fibre.	L3	5
	c	Explain how clothing provides thermostatic protection to human body by absorbing moisture and give heat of wetting values of any 4 fibres.	L2	5
Module-3				
Q. 05	a	With suitable units state how do you express the results of stress-strain (tensile) properties. A fibre of length 10cm and linear density 8.0 tex is tested for tensile properties. Fibre broke at a load of 400 gms and length of fibre at breakage was 10.15cm. Determine tensile strength (in gpd, NPT, gPT) and % elongation at break (% cb). Draw approximate stress / strain curve for fibre and name the fibres belonging to this tensile property.	L4	10
	b	What are Dynamic Mechanical properties with the help of geometric	L2	10

		constructions? Explain various parameters under DMP and also explain how DMP helps in understanding structural relaxations in PET.		
OR				
Q. 06	a	With the help of graphs, explain factors affecting stress relaxation and creep and from elongation time graph show that fibres are non-linearly visco elastic.	L3	10
	b	With the help of graphs, show that cotton gain strength and viscose loses strength when wetted and give the reason for above difference on the basis of structural changes.	L3	5
	c	A filament of length 50cm was extended to 5.0% and 10.0% of its initial length, when force was removed, the filament length was 51.25 cm after removal of 5% extension and it was 53.0 cm after removal of 10% extension. Determine elastic recovery of the fibre at 5% and 10% initial extension and draw approximate graph for elastic recovery V/s initial strain	L3	5
Module-4				
Q. 07	a	Define the term Friction. State and explain Amonton's laws of friction, with respect to fibre friction.	L2	10
	b	Explain the importance of studying shear and compressional property of fibre in understanding the comfort and handle properties of garments.	L2	10
OR				
Q. 08	a	Define the term Flexural and Torsional rigidity of fibre. With the help of sketch, explain a method by which flexural rigidity of fibre is determined.	L2	10
	b	Explain how friction plays dual role in mechanical processing of textiles and describe DFE in wool fibres.	L2	10
Module-5				
Q. 09	a	State the problems created by presence of static charges in textile and garment industry and explain any two remedies for the same.	L2	10
	b	State the importance of studying Thermal Conductivity (K) Thermal Expansion (E) and Specific heat of fibres and state why $K_{11} > K_{12}$,	L2	10
OR				
Q. 10	a	With the help of a circuit diagram, explain the method of determining electrical resistance of fibre and show the graph for effect of MR on electrical resistance of fibres.	L2	10
	b	Define the term Birefringence of fibre. Explain the method of determining Birefringence of Synthetic fibres and give Birefringence value for any five fibres.	L2	10

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.