GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – II • EXAMINATION – WINTER • 2014

Subject code: 1722505   **Date: 05-12-2014**

Subject Name: Advanced Fiber Properties

Time: 02:30 pm - 05:00 pm   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	How hysteresis of molecule, directly and indirectly attached water affect absorption of water?	**07**
	(b)	Discuss retention of liquid water by centrifuging method of wet fibre.	**07**
Q.2	**(a)**	Derive relation between (i) Area, volume and axial swelling (ii) Diameter and area swelling	**07**
	(b)	What are the errors in fibre density testing by liquid displacement? How to measure density by degree of order?	**07**

OR

	(b)	Explain Chapman's structural mechanics of wool fibre.	**07**
Q.3	**(a)**	How ideal spring and dashpot in series and parallel help to define viscoelastic behavior of fibre with reference to time dependent theory?	**07**
	(b)	What is permittivity? How to measure dielectric properties of textile material at radio frequency?	**07**

OR

Q.3	**(a)**	Derive an equation of shear modulus for fibres with reference to torsional rigidity.	**07**
	(b)	Describe measurement of bending of fibres by a loop method.	**07**
Q.4	**(a)**	What are the essential features of Oliver's and Bowden's apparatus for measurement of fibre friction?	**07**
	(b)	Define yield stress and yield strain of Meredith's construction.	**07**

OR

Q.4	**(a)**	Define the terms: (i) Initial modulus (ii) Work rupture of fibre (iii) Load elongation curve of any textile fibre.	**07**
	(b)	List out and also discuss effect of various parameters on fibre friction.	**07**
Q.5	**(a)**	Discuss various factors which influence the rate of conditioning.	**07**
	(b)	Define dynamic, thermodynamic and transient equilibrium.	**07**

OR

Q.5	**(a)**	At steady state conditions with vapour pressure gradient and temperature gradient, explain the penetration of a change into mass.	**07**
	(b)	Derive an equation of differential heat of sorption based on water vapour equation.	**07**

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