Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: 172905 **Date: 27/12/2012**

Subject Name: Fibre Science & Elements of Textile Structure

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	State the methods of investigation of fibre structure and explain the X-Ray diffraction technique & Infrared radiation technique.	**07**
	(b)	Explain the relation between regain of textile material and R.H. of the atmosphere. Explain the terms: - Differential heat of sorption and Integral heat of sorption.	**07**
Q.2	**(a)**	Explain the terms: - Primary creep, Secondary creep and explain the viscoelastic behavior of fibres.	**07**
	(b)	Discuss the disturbing factors in ideal packing of yarn. Explain idealized helical geometry of twisted yarn with neat sketch. What are the assumptions made in it?	**07**
		OR	
	(b)	Discuss theory of crimp interchange. Calculate fractional cover of a monofilament nylon fabric having 60ends/cm and 50 picks/cm woven with 5x5 tex.	**07**
Q.3	**(a)**	i. Explain the changes in regain, temperature and vapour pressure during conditioning.	**04**
		ii. Explain the absorption in crystalline and non crystalline region.	**03**
	(b)	Mention different models of micro fine structure of fibres and write on Paracrystalline model.	**07**
		OR	
Q.3	**(a)**	Explain the extension and recovery in the rayon fibres.	**07**
	(b)	Write a short note on "Swelling in fibres".	**07**
Q.4	**(a)**	Explain Co-Axial and Idealised helix model.	**07**
	(b)	Derive the relationship between Packing density and Rate of migration.	**07**
		OR	
Q.4	**(a)**	Derive Contraction in yarn $Cy = ½(1+\sec\alpha)$ and Retraction in yarn $Ry = \tan^2(\alpha/2)$.	**07**
Q.4	**(b)**	Derive the relationship between (a) Specific volume of yarn and Twist factor, (b) Two Packing Co-efficient K1 and K2.	**07**
Q.5		With a neat sketch discuss the Peirce model for plain fabric. Discuss Fractional Cover and Total Cover.	**14**
		OR	
Q.5		Discuss the special conditions of Peirce model for plain fabric when angle (ø) is small, when filling is straight and when fabric is jammed.	**14**

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