Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- VIIth SEMESTER–EXAMINATION – MAY/JUNE- 2012

Subject code: 172905 **Date: 28/05/2012**

Subject Name: Fibre Science & Elements of Textile Structure

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)**	Discuss: - (i) Crystallinity and orientation.	**04**
		(ii) Infrared radiation technique.	**03**
	(b)	State the methods of investigation of fibre structure and explain the X-Ray diffraction technique & NMR technique.	**07**
Q.2	**(a)**	What do you under stand by Creep? Explain: - Primary creep, Secondary creep and Viscoelastic behavior of fibres.	**07**
	(b)	Explain Idealised helix model with a neat sketch.	**07**
		OR	
	(b)	Derive the relationship between Specific volume of yarn, Yarn Count and Twist.	**07**
Q.3	**(a)**	List out the different models of micro fine structures of fibres with neat sketches. Write on fringed micellar structure.	**07**
	(b)	i. Explain the changes in regain, temperature and vapour pressure during conditioning.	**04**
		ii. Dicuss absorption in crystalline and non crystalline region.	**03**
		OR	
Q.3	**(a)**	Explain swelling in fibres.	**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.4	**(a)**	Explain packing of yarn. Discuss the disturbing factors in ideal packing of yarn.	**07**
	(b)	Derive the relationship between Packing density and Rate of migration.	**07**
		OR	
Q.4	**(a)**	Derive relationship between yarn diameter and yarn count for cotton yarn. Taking cotton fibre density = 1.54gms/cc and specific volume of yarn = 1.1cc/gm.	**07**
	(b)	Derive Retraction in yarn $Ry = \tan^2(\alpha/2)$.	**07**
Q.5	**(a)**	With a neat sketch discuss the Peirce model for plain fabric.	**10**
	(b)	Discuss Fractional Cover and Total Cover.	**04**
		OR	
Q.5	**(a)**	Discuss the special conditions of Peirce model for plain fabric when angle (ø) is small, when filling is straight	**10**
	(b)	Derive the relationship between Two Packing Co-efficient K1 and K2.	**04**

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