

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 $C_y = \frac{1}{2}(1+\sec\alpha)$ and Retraction in yarn $R_y = \tan^2(\alpha/2)$. **07**
- Q.4 (b)** Derive the relationship between (a) Specific volume of yarn and Twist factor, (b) Two Packing Co-efficient K_1 and K_2 . **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 (θ) is small, when filling is straight and when fabric is jammed. **14**
