

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 understand 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. Discuss 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 $R_y = \tan^2 (\alpha/2)$. **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 (ϕ) is small, when filling is straight **10**
(b) Derive the relationship between Two Packing Co-efficient K_1 and K_2 . **04**
