

(Following Paper ID and Roll No. to be filled in your Answer Books)

**Paper ID : 160661**

Roll No. 

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**B.TECH.**

**Theory Examination (Semester-VI) 2015-16**

**STRUCTURE & PROPERTIES OF FIBRE**

*Time : 3 Hours*

*Max. Marks : 100*

**Section-A**

**1. Attempt all parts and each parts carry two marks (1 to 30 words)**

- (a) Sonic modulus tester is used to estimate\_\_\_\_\_.
- (b) Bi-refringence of anisotropic materials is the phenomenon of \_\_\_\_\_.
- (c) Basic unit for fibre forming cellulose in cotton fibre is \_\_\_\_\_ .
- (d) How does crystalline orientation of fibres measures?
- (e) What is the concept of Transmission electron microscope (TEM) ?

- (f) How does fibre fracture perform to analyse the fracture mechanism of textile fibres?
- (g) Number of furnaces used in Differential Scanning Calorimeter (DSC) to satisfy the null balance principle of DSC \_\_\_\_\_ .
- (h) Write the name of thermal analysing technique use to scan the glass transition temperature (T<sub>g</sub>) of drawn fibres precisely.
- (i) Why does slightly lower value of crystallinity calculated by density gradient column method.
- (j) Why does linear chain polymer give higher strength fibre than branched chain fibre forming polymer ?

**Section-B**

**2. Attempt any five parts and each part carry ten marks (250 words)**

- (a) Prove that fibre crystallinity fraction can be determined by density gradient column by measuring the density of fibres.
- (b) Which technique is best suitable to calculate precise value of crystallinity % in a textile fibre among DSC, X-ray diffraction and Density Gradient Column? Justify your answer.

- (c) How does TGA thermogram help to understand the thermal stability of a material? Explain with the help of some typical diagrams.
- (d) Discuss about Birefringence phenomenon in textile fibres. Comment on the statement that Birefringence is the measurement of overall orientation both in amorphous and crystalline region.
- (e) What is fibre friction? Discuss about various technique to measure fibre and yarn friction.
- (f) Discuss about fibre structure of cotton fibre.
- (g) Calculate the moisture regain of cotton under ideal conditions.
- (h) What is atomic force microscopy (AFM) ? Discuss about the working principle of AFM.

### Section-C

**Note : Attempt any two question and each question carry 15 marks (450 words)**

3. What is transmission electron microscope (TEM)? How does TEM become useful to characterize various textile materials?

4. Explain the heat of absorption in case of textile material? Discuss about differential and integral heat of absorption and relation between them. Define the quantitative theory of moisture absorption
5. Discuss about the working principle of Differential Scanning Calorimeter (DSC). How will you analyse various DSC thermograms? Explain by assuming various DSC thermograms.

