**Printed Pages : 1** **Roll No.** | | | | | | | | | | | **EC011**

**B. TECH.**

**THEORY EXAMINATION (SEM–VI) 2016-17**

**STRUCTURE AND PROPERTIES OF FIBRE**

***Time : 3 Hours*** ***Max. Marks : 100***

***Note :*** *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

**SECTION – A**

**1. Attempt all parts of the following questions: 10 x 2 = 20**

**(a)** What is the concept of Transmission electron microscope (TEM)?

**(b)** How does fibre fracture perform to analyse the fracture mechanism of textile fibres?

**(c)** Number of furnaces used in Differential Scanning Calorimeter (DSC) to satisfy the null balance principle of DSC

**(d)** What should be Molecular weight of Polyethylene terephthalate polymer suitable for fibre formation?

**(e)** What is Polydispersity of polymers?

**(f)** What is the scanning medium to scan the sample under Scanning Electron Microscope?

**(g)** What is the principle of working of Fourier Transform Infra-red Spectroscopy (FTIR)?

**(h)** Write the name of thermal analysing technique in order to scan the melting behaviour of polymers.

**(i)** What is the prime application of Thermogravimetric analysis (TGA)?

**(j)** Write the essential features of chemicals used to form density gradient column.

**SECTION – B**

**2. Attempt any five of the following questions: 5 x 10 = 50**

**(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 and why?

**(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 are directly and indirectly attached water molecules? Discuss about quantitative theory of moisture absorption.

**(f)** Discuss about fibre structure of cotton fibre.

**(g)** Explain the image formation concept of scanning electron microscope.

**(h)** How does fibre fracture behaviour study with the help of Scanning electron microscope?

**SECTION – C**

**Attempt any two of the following questions: 2 x 15 = 30**

**3.** 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.

**4.** What is Fourier Transform Infrared Spectroscopy (FTIR)? How does FTIR become useful to characterize various textile materials?

***5.*** Explain the fine structure of wool fibre. Correlate the structure and morphology of wool fibre to its properties