[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2064)

14688

B. Tech 4th Semester Examination

Properties of Fibres (O.S.)

TE-4001

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

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : The question paper consists of five sections A, B, C, D & E. The candidates are required to attempt one question from each section A, B, C & D and all the subparts of the question in Section E.

SECTION - A

1. (a) How x-ray diffraction can be used to find crystalline orientation of fibre? (10)

   (b) What is micelle? Give a brief accounts of fringed miceller structure with necessary diagram. (10)

2. With the help of neat sketch, explain electron microscopic determination of fibre structure. (20)

SECTION - B

3. What is direct and indirect attachment of water? What is Peirse's theory of moisture absorption and derive the relation.

   $$\frac{P}{P_0} = 1 - e^{-\beta c_b}$$

   where, the notations have their usual meaning. (20)

4. (a) Define the heat of sorption and explain the measurement technique. (10)

   (b) Describe a relation between moisture regain and moisture content. (10)

SECTION - C

5. (a) Write a brief note on dynamic testing. (10)

   (b) Draw the stress-strain curves for purely elastic, purely viscous and viscoelastic fibres in a dynamic test. (10)

6. With the help of Kalvin ad Maxwell Model, discuss how models can be set to describe the properties of fibre? (20)

SECTION - D

7. (a) What do you mean by 'Birefringence'? How birefringence can be used to determine fibre structure? (10)

   (b) State the role of static generation in processing of fibres. (10)

8. Write short notes on:

   (a) Fibre friction and its measurement. (10)

   (b) Dielectric properties of textile material. (10)

SECTION - E

9. (i) What are temporary and permanent setting?

   (ii) What is work recovery and how it is different from elastic recovery?

   (iii) If the specific index of birefringence of a fibre 'x' is higher than the fibre 'y', then what does it imply?

(iv) What information can be obtained from stress-strain curve of a fibre?

(v) What is second order transition temperature? Discuss its importance.

(vi) Name different methods to findout the crystallinity of a fibre.

(vii) What is Tg?

(viii) Mention the advantages and disadvantages of fibre swelling.

(ix) Define static and kinetic friction.

(x) What is thermal shrinkage of fibre? (10×2=20)