14650

B. Tech 4th Semester Examination

Properties of Fibres (N.S.)

TE-221

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 : Attempt five questions in all, selecting one question from each section. Section E contains only one question which is compulsory.

SECTION - A

1. (a) Discuss different models to explain the physical structure of a textile fibre. (10)

   (b) Explain the principle of SEM to analyse the physical structure of a fibre. (10)

2. (a) What is 'degree of order' and 'degree of orientation'? Mention its importance. (8)

   (b) What are different method of analysing chemical structure of a fibre? Explain the principle of IR spectroscopy to identify chemical structure of a fibre. (12)

SECTION - B

3. (a) Define relative humidity and moisture regain. Discuss the relation between these two. (8)

(b) Define swelling of a fibre. Discuss different form of swelling occur in a fibre. How these are measured. (12)

4. Explain the principle and method of measurement of fibre friction by static method. How load and area of contact affect the friction. (20)

SECTION - C

5. (a) Discuss the factors affecting the results of tensile testing. (6)

(b) Define creep and stress relaxation. (4)

(c) Explain the mechanical behaviour of fibre with the help of spring and dash pot placed in series alongwith the drawback of model. (10)

6. (a) Define different dielectric properties. Discuss the effect of temperature and humidity on dielectric properties. (14)

(b) Define bending and torsional rigidity of a fibre. Discuss their importance. (6)

SECTION - D

7. (a) What structural changes occur in a fibre at glass transition temperature? (10)

(b) Discuss the role of static charge in textile. Discuss the problem associated with static charge generation. (10)

8. (a) Define double refraction and refractive index ellipsoid. (6)

(b) How the birefringence of a fibre is measured? (10)

(c) Define reflection and lustre. (4)

SECTION - E

9. Briefly answer the following:

(i) Define moisture content. How it is related to moisture regain?

(ii) What is hysteresis in moisture absorption?

(iii) Define Elastic Recovery.

(iv) Define static and kinetic frictions.

(v) What is primary and secondary creep?

(vi) Define glass transition temperature and melting temperature.

(vii) Mention the difference between IR and x-ray measurement.

(viii) What is weak link effect?

(ix) What is directional frictional effect?

(x) What is Dichroism? (10×2=20)