

Roll No.

Printed Pages : 2

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BT-5/D-13

STRUCTURE AND PROPERTIES OF FIBRES

Paper-TT-301-A

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt five questions in all, taking at least one question from each unit.

Unit-I

1. Discuss the theories of fine structure of fibres. Discuss the principle of X-ray diffraction by powder specimens. Compare X-ray method with other methods of measurement of crystallinity.
8+7+5
2. Explain the physical structure of silk and jute fibre. Discuss the physical and chemical properties of nylon, acrylic and viscose fibres.
8+12

Unit-II

3. Explain Maxwell model for viscoelasticity alongwith its advantages and disadvantages. Which factors affect mechanical testing of fibres? How lubricants affect the coefficient of friction in fibres?
10+4+6
4. Define modulus, work of rupture and yield point. What is stress-relaxation and how can it be measured for fibres? Explain creep from molecular point of view. Deduce $T_2/T_1 = e^{\mu\theta}$ for a fibre or yarn passing over a guide.
4+7+4+5

Unit-III

5. What is the relation between moisture regain and relative humidity? Discuss Fick's second law of moisture diffusion along with its drawbacks and their elimination. What is the relation between birefringence and orientation?
4+10+6

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6. Establish a relationship between indirectly attached water molecules and relative humidity in cotton. Explain different types of swelling in fibres. How can you measure birefringence of fibres with the help of phase difference of light?
7+3+10

Unit-IV

7. "Fibres have negative thermal expansion coefficient" explain. Why melting temperature is not a fixed temperature in fibres. What type of structural changes take place during melting and at glass transition temperature of fibre?
8+5+7
8. Why there is an enormous change in electrical resistance of hygroscopic fibre with small change in moisture content? How the dielectric constant of fibre material is measured? Which factors affect the dielectric properties and how? How electrical resistance of a fibre material is measured?
4+5+6+5

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