

2012

TEXTILE FIBRES – II

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Objective Type Questions)

1. Write True (*T*) or False(*F*) for any *ten* of the following :

10 × 1 = 10

- i) High modulus fibres have a very high elongation characteristics.
- ii) Mean length of fibre can be calculated from Baer Sorter Diagram.
- iii) Silk fibre does not have cystine linkage as in the case of wool.
- iv) Moisture regain has no effect on tensile properties of fibre.
- v) Micro structure of natural fibres cannot be modified by mechanical drawing process.
- vi) Acrylic fibres can be easily melt spun.
- vii) Nylon 66 melts at higher temperature than that of Nylon-6.
- viii) Wool fibre exhibit a typical property of relative fibre movement, known as felting.
- ix) Assembly of large fibres can hold more fluids than that of the small fibres.
- x) *T_g* of synthetic fibres is lower than its melting point.

xi) Tenacity of textile fibres is generally expressed in N/Text or gm/denier.

xii) Bi-refrindex value of cotton is lower than viscose fibre.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Compare the chemical structure of wool fibre with that of silk fibre.
3. "Secondary bonds are also very much important to give integrity of a polymeric textile material." Discuss it with examples.

OR

Discuss the role of hydrogen bonds in textile fibre with examples.

4. Explain why are all polymers not suitable for fibre formation ? Discuss the essential requirements of fibre forming polymers, mentioning special reference to Nylon-6 polymer. 1 + 4

5. What do you understand by visco-elastic nature of textile fibre ? Explain the microstructure of cellulose by fringe micell model.

6. What do you understand by orientation, crystallinity and amorphous region of fibres ? Discuss the influence of orientation on tensile properties of fibre. 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) What do you understand by tensile properties of textile fibre ? 3

b) Discuss with suitable diagrams, all the definitions of parameters related to tensile properties of a textile fibre.

8

c) What is the difference between the elastic and plastic deformation ?

4

OR

Define glass transition temperature (T_g) of a fibre/polymer.

Explain the working of a DTA / DSC instrument for thermal analysis of fibre. Explain the method of determination of crystallinity and crystal orientation of fibre. How is density data used to determine the crystallinity ?

3 + 5 + 4 + 3

8. What is the effect of fibre length on the ultimate yarn ? What are the techniques generally used for measuring the fibre length of cotton fibres ? Show with a suitable diagram, the fibre length measurement technique by digital fibrograph technique.

5 + 5 + 5

9. What are the interaction of fibres with moisture, moisture regain and moisture content ? Why does physical properties of cotton cellulosic change with moisture uptake ? What are the effects of solvents on textile fibres with respect to solubility parameters ?

6 + 3 + 6

10. Explain critically the effect of fibre cross-sectional shapes, surface area and linear density in their practical end use. What are the different techniques used to characterise the linear density of yarns ?

8 + 7

11. a) Discuss the special features of fibre cross-sectional shape and the surface area.

5

b) Show the cross-sectional view of cotton, silk and wool fibre.

6

c) What is the effect of maturity of cotton fibre of tensile properties ?

4

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