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 :

$10 \times 1 = 10$

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) *Tg* of synthetic fibres is lower than its melting point.

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

xii) Bi-refringence 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 (Tg) 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 fibograph 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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