



B.TECH DEGREE EXAMINATIONS: MAY 2017

(Regulation 2015)

Fourth Semester

TEXTILE TECHNOLOGY

U15TXT404: Physical Properties of Textile Fibres

COURSE OUTCOMES

- CO1:** Outline the fundamentals of fibre structures and various properties of polymer system.
CO2: Interpret the relationship between various parameters and the moisture properties of fibres
CO3: Explain about the concepts of mechanical properties of fibres
CO4: Describe the optical and frictional parameters related with fibre properties
CO5: Discuss about the fundamentals and measurement of electrical and thermal properties of fibre
CO6: Summarize the tensile properties of various textile fibres

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1.

CO2 [K₂]

List I	List II
A. Hysteresis	i. Transient Equilibrium
B. Standard Condition	ii. Meta-stable state
C. Hydrophilic Group	iii. 65% RH, 27° C
D. Conditioning Process	iv. (-NH-)

- | | A | B | C | D |
|----|-----|-----|-----|----|
| a) | ii | i | iii | iv |
| b) | iii | iv | ii | i |
| c) | ii | iii | iv | i |
| d) | iii | i | ii | iv |

2. Degree of order ranges from _____ to _____

CO1 [K₁]

- | | |
|------------------|------------------|
| a) 0 to 1 | b) 0 to Infinity |
| c) 1 to Infinity | d) 1 to 2 |

3. Consider the following statements. CO1 [K₁]
1. If the length of the polymer increases, the probability of improvement in cohesiveness and strength of a fibre will increase.
 2. As the orientation of polymer chain increases in a polymer system, the crystalline region decreases.
 3. Compared to a branched polymer, a linear polymer will have more inter-molecular forces in its polymer system.
 4. The dye molecule penetration is high in amorphous region than crystalline region.
- Which is NOT correct?
- a) 2,3 b) 4,3
 c) 1,3 & 4 d) 1,4
4. Extension with time under an applied load is called_____ CO3 [K₁]
- a) Creep b) Creep recovery
 c) Creep relaxation d) Primary creep
5. Assertion (A): As the vapour pressure of atmosphere increases, the RH% increases. CO2 [K₂]
 Reason(R): As the dampness of atmosphere increases, the vapour pressure inside the cotton fibre increases.
- a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A
 c) A is true but R is false d) A is false but R is true
6. As one of the following decreases, flexural rigidity increases. CO3 [K₂]
- a) Density of fibre b) Tensile modulus of fibre
 c) Linear density of fibre d) Shape Factor of fibre
7. Consider the following fibres with respect to birefringence. CO4 [K₂]
 1) Ramie 2) Polyester 3) Triacetate 4)120% stretch viscose rayon
- Sequence the fibres in increasing order.
- a) 3, 4, 1& 2 b) 3, 2, 4 &1
 c) 3, 4, 2& 1 d) 3, 2, 1& 4
8. Resistance in ohms between the ends of a specimen 1 m long and of mass 1kg is called CO5 [K₂]
- a) Mass specific resistance b) Specific resistance
 c) Permittivity d) Capacitance

9. Assertion (A): As the orientation of polymers in a fibre increases, the refractive index and birefringence value increases. CO4 [K₂]

Reason(R): Light polarization in parallel axis is much higher than light polarization in perpendicular direction for highly oriented fibre.

- a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false d) A is false but R is true

10. As the temperature increases, the electrical resistance of fibres CO5 [K₂]

- a) Decreases b) Increases
c) Increases and then decreases d) Decreases and then increases

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. What is degree of order? CO1 [K₂]
12. Contrast the crystalline region from the amorphous region. CO1 [K₂]
13. Compare the moisture content and moisture regain. CO2 [K₂]
14. Define: Relative Humidity. CO2 [K₂]
15. What is tensile stress and strain? CO3 [K₂]
16. What is torsional rigidity? CO3 [K₁]
17. Contrast the optical orientation factor and average angle of inclination CO4 [K₂]
18. Relate Lambert's law and Dichroic Ratio. CO4 [K₂]
19. Define: Amontons's Law. CO5 [K₁]
20. Compare glass transition temperature and melting point. CO5 [K₂]

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)

(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Illustrate about the various intra and inter molecular forces acting on fabric structure with examples. CO1 [K₂]
22. Compare the moisture regain curves of various fibers through suitable graphs and justification. CO2 [K₂]

23. Explain on the moisture conditioning process adopted for various fibres with graphs. CO2 [K₂]
24. Demonstrate the stress-strain curves of various textile fibres along with tenacity and elongation values. CO3 [K₂]
25. i) Interpret about effect of fibre density and moisture regain on optical properties of fibres through Gladstone and Dale's law (7) CO4 [K₅]
ii) Explain on the luster and reflection properties of fibres. (7) CO4 [K₂]
26. Outline about thermal properties of various thermoplastic fibres with first and second order transitions. CO5 [K₂]
27. Elaborate on problems caused in textile industry by static electricity and show the various methods to control the same using diagrams. CO5 [K₂]
