KUMARAGURU college of technology
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Register Number:……..

M.TECH DEGREE EXAMINATIONS: JAN 2015

(Regulation 2014)

First Semester

TEXTILE TECHNOLOGY

P14TXT101: Fibre Science

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match the items in **Group I** with those in **Group II**. [K_2]

	Group I		Group II
P	Crystallinity	1	Nuclear Magnetic Resonance
Q	Surface features	2	Infrared spectrophotometer
R	Crystalline and amorphous Regions	3	Scanning electron microscope
S	Functional groups	4	x-Ray Diffraction

a) P-2, Q-1,R-3,S-4 b) P-3, Q-4,R-2,S-1

c) P-4, Q-3,R-2,S-1 d) P-4, Q-3,R-1,S-2

2. The density of polyester fibre is [K_3]

a) More than polypropylene but less than nylon b) Same as that of polyethylene

c) More than nylon but less than cotton d) More than Flax

3. Consider the following six fibres. [K_2]

1.Polypropylene 2. Wool 3. Nylon 4. Polyester 5. Cotton, 6. Viscose rayon.

The descending order moisture regain of the fibres is

a) 2-6-4-3-5-1 b) 2-6-5-3-4-1

c) 6-2-5-3-1-4 d) 6-2-1-3-4-5

4. Consider the following statements. During conditioning of fibre and with respect to time, [K_3]

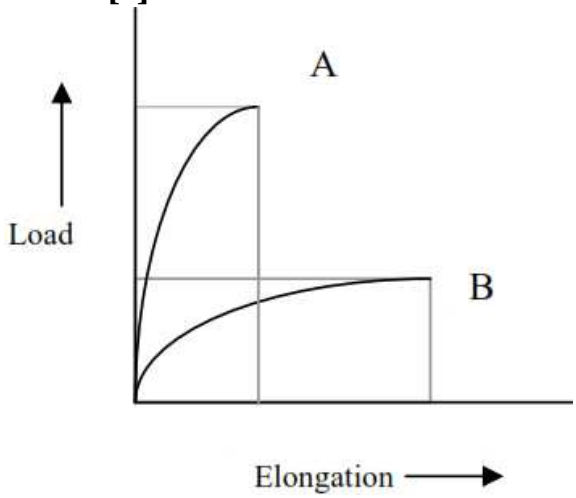
1. Immediately after the transient equilibrium, the vapour pressure of fibre and the atmosphere are same.
2. The regain value of fibre steadily increases till the final equilibrium
3. The temperature of fibre decreases till transient equilibrium and steadily increases till the final equilibrium
4. The vapour pressure of fibre steeply increases and maintains constantly till the final equilibrium.

Which of these statements correct?

a) 1,2,4 b) 1,4,3

c) 2,4 d) 3,4

5. Given below are the load-elongation characteristics of two monofilament yarns A and B having the same denier and the work of rupture. Consider the following assertion **[a]** and reason **[r].** [K_4]



[a] Fabrics made from these two yarns, with the same weave and sett, will have the same resistance to high impact.

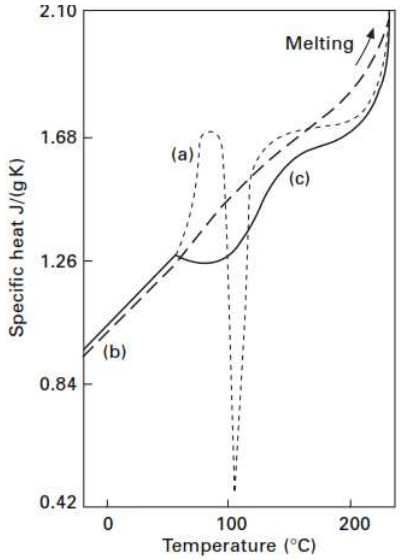
[r] The work of rupture of the two fabrics is the same.

a) **[a]** is right and **[r]** is wrong b) Both **[a]** and **[r]** are wrong

c) Both **[a]** and **[r]** are right d) **[a]** is wrong and **[r]** is right

6. Assertion(A) : Creep is extension with time under an applied load [K_3]
Reasoning(R): The complementary effect is stress relaxation, the reduction of tension with time under a given extension.

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

7. 

[K_2]

The specific heat of Dacron of three states is given. Find the suitability of each curve (a, b & c) with the various states of Dacron fibre.

a) (a) annealed undrawn (b) undrawn (c) commercially drawn fibres
b) (a) undrawn (b) annealed undrawn (c) commercially drawn fibres
c) (a) commercially drawn fibres (b) annealed undrawn (c) undrawn
d) (a) commercially drawn fibres annealed undrawn (b) undrawn (c)

8. Consider the following manmade polymers for thermal conductivity (mW/mK). [K_2]
1. Polyethylene 2. Polypropylene 3. Nylon 4. Polyester 5.Cellulose Acetate
The correct ascending sequence of thermal conductivity is

a) 2-4-5-3-1
b) 4-2-3-5-1
c) 1-4-5-3-2
d) 2-4-3-5-1

9. Refractive index is the ratio of [K_2]

a) Sine angle of incidence of light to sine angle of reflection of light
b) Sine angle of incidence of light to Cos angle of refraction of light
c) Sine angle of refraction of light to sine angle of incidence of light
d) Sine angle of incidence of light to Sine angle of refraction of light

10. The highest birefringence value of the following fibres is [K_1]

a) Ramie
b) Acrylic fibre
c) Polyester
d) Cotton

PART B (10 x 2 = 20 Marks)

11. Differentiate: Order and Orientation [K_2]

12. Underline the principle of structural studies using Nuclear Magnetic Resonance on fibres. [K_1]

13. Define: Integral heat of sorption. [K_1]

14.	Recall the types of swelling measurements.		[K_1]
15.	Contrast the terms loop strength and knot strength.		[K_4]
16.	Cite the examples from applications of fiber's flexural rigidity in textile industry.		[K_2]
17.	Rate the effectiveness of various techniques being used to control the problems of static electricity in a projectile weaving of polyester warp and viscose weft.		[K_5]
18.	Define: Specific Heat and Thermal Conductivity.		[K_1]
19.	Relate between birefringence and optical orientation factor of a fibre.		[K_3]
20.	Give in own words on dichroism of fibres.		[K_2]

PART C (10 x 5 = 50 Marks)

21.	Compare the fringed fibrillar and fringed micelle structure of polymers.		[K_3]
22.	Analyze the molecular structure of cotton and polyester using the patterns of X-ray diffraction technique.		[K_4]
23.	Discuss about the any five factors influencing the rate of conditioning		[K_2]
24.	Relate the interaction between moisture and heat changes in fibres.		[K_4]
25.	Cite the examples of variability effects on tensile properties of textile materials.		[K_2]
26.	Interpret the structural effect in cotton fibre.		[K_3]
27.	Explain about the mechanism of heat setting on thermoplastic fibres.		[K_2]
28.	Draw and examine the graph of thermo gravimetric analysis (TGA) from the polyester fibre.		[K_4]
29.	Describe the directional frictional effects of wool fibre.		[K_2]
30.	Recall about the theory on luster.		[K_1]

PART D (2 x 10 = 20 Marks)

31.	Illustrate the various thermal transitions occurring in polymers including the first order, second order and multiple types with suitable graphs and diagrams.	10	[K_3]
32.	Contrast the Scanning Electron Microscope and Transmission Electron Microscope with minimum ten valid points in terms of working principle, operation, applications, sample requirement, cost, characterization, advantages and disadvantages.	10	[K_4]

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