KUMARAGURU
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Register Number:……

M.TECH. DEGREE EXAMINATIONS: JUNE 2018

(Regulation 2015)

Second Semester

APPAREL TECHNOLOGY

P15ATE303 : Nano Textiles and Apparels

COURSE OUTCOMES

CO1: Describe the nano technology concepts and applications in textiles and apparel sector.

CO2: Explain the methodology of synthesizing nano materials by different processes and techniques.

CO3: Gains knowledge on nano tubes, nano composites and nano coatings.

CO4: Acquire knowledge on next generation nano finishes on Textiles and Apparels.

CO5: Explain the characterization techniques and instrumentation for nano materials.

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A): Composite fibres reinforced with clay nanoparticles exhibit flame retardant, anti UV and anti corrosive behaviours CO1 [K2]

   Reason (R): Clay nanoparticles are composed of several types of hydrous aluminosilicates and each type differs in chemical composition and crystal structure

   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

2. Buckyballs are type of --------- shaped like ---------- CO1 [K1]

   a) Fullerene; a hollow cylinder
   b) Graphite; flat layers
   c) Fullerene; a geodesic dome
   d) Graphite; a crystal

3. The diameter of quantum dots ranges between CO2 [K1]

   a) 1-10 nm
   b) 1-100 nm
   c) 1-1000 nm
   d) Several nm^2 - μm^2

4. Match List I with List II CO2 [K_3]

List I	List II
A. Core sheath or hollow structure	i. Needleless electrospinning
B. Microfibres to sub micron range	ii. Coaxial electro spinning
C. Strong repulsion & poor fibre quality	iii. Multijet electro spinning
D. Free liquid surface	iv. Hot Melt electro spinning

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

5. Assertion(A) : Carbon nanotubes have high tensile strength CO3 [K2]

Reason (R): Each carbon tube is a very large molecule and carbon – carbon bonds

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. The angle between the axis of the hexagonal pattern and the axis of the carbon nanotube is called nanotube's ---------- angle CO3 [K1]

a) Chiral
b) Hexagonal
c) Acute
d) Obtuse

7. Multiple selection item with multiple choice code CO2 [K3]

The filler particles are added to composite materials for --------

i. Strong adhesion
ii. Visco elastic properties
iii. Heat distortion
iv. Yield strength

a) i and ii
b) ii and iii
c) i and iv
d) ii and iv

8. The stain repellent fabrics from Nano-Tex are called CO4 [K1]

a) Nanowhiskers
b) Aquapel
c) Nanosphere
d) Nanocare

9. The resolution of Scanning Electron Microscopy (SEM) is CO5 [K_2]

a) 200 nm b) 0.2 nm

c) 1.5 nm d) 15 nm

10. Sequencing type item CO3 [K3]

Although various mixing methodologies are commonly used, for final sample fabrication the techniques used in the order of their preference is

1. Hot pressing
2. Pultrusion
3. Injection-moulding
4. Hand Lay-up

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

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

PART B (10 x 2 = 20 Marks)

11. Define nanoscale. CO1 [K2]
12. List the methods of controlling nanofiber orientation. CO2 [K_1]
13. Why the viscoelastic property in electro spraying is important? CO2 [K3]
14. What is the principle of electrostatic atomization? CO2 [K2]
15. Define Carbon Nanotubes. CO3 [K2]
16. Quote an example of multifunctional polymer nanocomposites for industrial application and state the reason. CO3 [K3]
17. Nano size particle finishes are better than conventional size particle to block UV. Give reason. CO4 [K2]
18. Write the features of NanoTouch. CO4 [K2]
19. What is characterization? CO5 [K1]
20. Differentiate SEM and TEM. CO5 [K_3]

PART C (6 x 5 = 30 Marks)

21. Give present and future applications of nanomaterials. CO1 [K3]
22. Explain the solgel synthesis and process of making nanostructured surfaces. CO2 [K4]
23. Explain the method of producing continuous yarn by multi collector yarn process. CO2 [K4]
24. Elucidate the development of dyeable polypropylene and different methods to dye polypropylene CO3 [K5]

25.	Describe the application of nanotechnology in home furnishings	CO4	[K4]
26.	Enlist the different characterization techniques of nanomaterial's and the typical uses	CO5	[K2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27.	Differentiate Top down and bottom up approaches.	CO1	[K5]
28.	Explain in detail the working principle and process of electro spinning and electro spraying by charge injection method.	CO2	[K4]
29.	List the methods for producing carbon nanotubes and explain any of the method with a neat sketch?	CO3	[K5]
30.	Tiny particles are going to shape our future with the next generation nano finishes. Explain this statement with example.	CO4	[K6]
31.	Explain the working of Scanning Electron Microscopy (SEM) with a neat sketch.	CO5	[K3]

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