



M.TECH DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2014)

Second Semester

APPAREL TECHNOLOGY

P14FTE303: Nano Textiles and Apparels

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code

[K₁]

List I	List II
A. Nanoshell	i. 100 nm
B. Hydrogen atom	ii. 2000 nm
C. E.coli bacteria	iii. 90 nm
D. Transistor	iv. 0.1 nm

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

2. Nanoscience can be studied with the help of _____

[K₃]

- | | |
|----------------------|------------------------|
| a) Quantum mechanics | b) Newtonian mechanics |
| c) Macro-dynamics | d) Geophysics |

3. Assertion (A): Electrospinning is preferred for production of polymer based nanofibers.

[K₁]

Reason (R): Polymers have colloidal state of molecules which split easy during high voltage.

- | | |
|-------------------------------|-------------------------------|
| a) (A) is right, (R) is wrong | b) Both (A) and (R) are right |
| c) (A) is wrong, (R) is right | d) Both (A) and (R) are wrong |

4. Which ratio decides the efficiency of nanosubstances in synthesis?

[K₂]

- | | |
|------------------------|--------------------|
| a) Weight/volume | b) Volume/weight |
| c) Surface area/volume | d) Pressure/volume |

5. Which of the following statements is/ are true? [K₁]
P. Volume to surface area ratio is very large for nanomaterials.
Q. The cut-off limit of human eye is 10^{-5} m.
R. Hardness of a SWNT is about 63×10^9 Pa.
S. Carbon nanotubes are cylindrical fullerenes.
a) P, S
b) P, R
c) Q, R
d) R, S
6. Being environmental friendly, application of _____ offer new technology and business [K₂]
opportunities for several sectors of the aerospace, automotive, electronics and biotechnology
industries.
a) Nanocomposites
b) Nanometal
c) Nanoparticle
d) Nanorubber
7. PMNC refers _____. [K₃]
a) Polymer Matrix Nanocomposite
b) Particle material Nanocomposite
c) Plastic Matrix Nanoparticle
d) Polymer Material Nanocomposite
8. Assertion (A): Preparation of titanium dioxide nanoparticles are mostly by sol-gel techniques. [K₁]
Reason (R): Hydrolysis and polycondensation reaction of an (in) organic molecule precursor
dissolved inorganic media.
a) (A) is right, (R) is wrong
b) Both (A) and (R) are right
c) (A) is wrong, (R) is right
d) Both (A) and (R) are wrong
9. CNTs are prepared mostly by _____ method. [K₁]
a) Chemical/vapour deposition
b) Sol-gel technique
c) Solvent
d) Pad-dry-cure
10. Sequence the following: Metal Matrix Nanocomposite (MMNC) has (i) improved hardness, [K₂]
(ii) improved surface area, (iii) improved higher compression, and (iv) improved electrical
conductivity.
a) i, iii, iv, ii
b) iii, i, ii, iv
c) ii, iv, iii, i
d) iv, iii, ii, i

PART B (10 x 2 = 20 Marks)

11. Write the fundamental concepts of nanotechnology. [K₂]
12. List out any two applications of nanotechnology in apparel manufacturing. [K₃]
13. How fibre orientation is controlled in electro spinning process? [K₁]
14. State the application of nanotechnology in tissue engineering. [K₃]
15. What is nanotube? State its applications. [K₂]

16. Write the purpose of cyclo dextrin in nano polymer coating. [K₄]
17. What is smart textile? State its merits. [K₂]
18. State the purpose of Nano-Tex in textile and apparels. [K₃]
19. Write the principle of X-ray diffraction. [K₅]
20. Differentiate between SEM and TEM with respect to applications. [K₄]

PART C (10 x 5 = 50 Marks)

21. Explain the sol gel synthesis of nano materials. [K₂]
22. Elaborate the scope of nano technology in textile application. [K₃]
23. Explain the electro spinning of nanofibers with suitable examples. [K₃]
24. Discuss any one of the methods of producing continuous nano filament yarns.. [K₃]
25. Compare and comment on discharge method and chemical vapour deposition method. [K₄]
26. Demonstrate the various approaches for improving dyeability of polypropylene. [K₄]
27. Enumerate the nanotechnologies for coating and structuring of textiles with examples. [K₄]
28. Write the features of Nano-Care and Nano-Dry for home furnishing and medical textiles. [K₃]
29. Explain the principle of energy dispersive x-ray spectroscopy (EDS) with neat illustrations. [K₅]
30. What is Mass loss calorimeter (MLC)? State its applications. [K₃]

PART D (2 x 10 = 20 Marks)

31. With neat sketches explain the electrospraying and electrospinning by the charge injection method and brief their concepts and characterization of nanofibers. [K₂]
32. Discuss the features of multifunctional polymer nanocomposites for industrial applications with suitable examples. [K₆]
