LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **BIOTECHNOLOGY**

THIRD SEMESTER – **NOVEMBER 2019**

16/17/18PBT3ES01 – NANOTECHNOLOGY

Date: 06-11-2019 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART – A

Answer ALL the Questions

I. Choose the correct answer (5 x 1 = 5 Marks)

1. Which principal factor causes nanomaterials properties to differ from other materials?
   a) Quantum size effect b) Shape c) Charge d) Nanowhiskers
2. Fabrics are extensively made out of nanomaterials like
   a) Fullerene b) Polymers c) Carbon nanotubes d) Megatubes
3. Differential scanning colorimetry are used for studying
   a) Lattice parameter b) Crystal kinetics c) Particle Dynamics d) Optical density
4. Which type of photoresist are widely used
   a) Positive b) Neutral c) Polymer d) Negative
5. Use of nanotechnology in communication system
   a) Nanoantenna b) Nanophotonic c) E-nose d) Nanotubes

II. State whether the following are true or false. (5x1=5 Marks)

6. Self assembly is a top down manufacturing technique.
7. Nanomaterials are used in light emitted electro luminescence devices.
8. Scherrer equation used to calculate crystallite size from the line broadening XRD pattern.
9. Alois Senfelder invented the lithography technique.
10. Surface acoustic wave gas sensor is s type of electronic nose biosensor.

III. Complete the following (5 x 1= 5 Marks)

11. _____is a consumer product which uses nanotechnology.
12. _____ ratio decides the efficiency of nanomaterials.
13. Miller indices are useful for interpretation of _____pattern.
14. Atomic force microscope uses _____ which scans sample surface.
15. _____based biosensors work on principle of conversion of biorecognition into mechanical motion.

IV. Answer the following, each within 50 words (5 x 1 = 5 Marks)

16. What are the advantages of nanocomposites?
17. Which metal is used with nanoparticles for antibiotic delivery?
18. Define numerical aperture
19. Expand STM.
20. What is siRNA?

PART B

Answer the following, each within 500 words. **(5 x 8 = 40 marks)**

Draw diagrams wherever necessary

21. (a) Explain the structure and properties of nanoparticles.

OR

(b) Discuss Faraday's gold colloid experiment on nanoparticles.

22. (a) Give a brief note on theragnostics.

OR

(b) Write a note on the applications of nanocoatings.

23. (a) Discuss briefly the Raman spectroscopy teehnique.

OR

(b) Briefly describe the electron spin resonance spectroscopy and its applications.

24. (a) Write a short note on transmission electron microscopy.

OR

(b) What is nanosphere lithography? Briefly enumerate its applications in nanotechnology.

25) (a) What are oligoarrays? How are they manufactured?

OR

(b) Write a short note on applications of nanosensors in neuron engineering.

PART – C

Answer any TWO of the following, each within 1500 words. **(2 x 20 = 40 Marks)**

Draw diagrams wherever necessary.

26. Give an account on biomimetic nanomaterials and their applications.
27. Write an account on nanoparticle-assisted PCR.
28. Elaborate on the differential scanning calorimetry method.
29. Write a detailed account on the role of nanotechnology in drug development, screening and targeted drug delivery.

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