



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – BIOTECHNOLOGY

THIRD SEMESTER – NOVEMBER 2017

16PBT3ES01 – NANOTECHNOLOGY

Date: 10-11-2017

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)

- Which among the following has a vast bandgap?
a) Semiconductors b) Insulators c) Conductors d) both a & c
- Which of these is a polymer based nanoparticle
a) Dendrimer b) Gold c) Liposome d) Neosome
- The following can be analysed using X-ray crystallography except
a) Bond length b) Bond angle
c) Molecular mass d) Cell dimensions.
- The sensitive material which is degraded upon exposure to electrons/light is
a) Mask b) Resist c) Cantilever d) Tip
- The technology called _____ uses polymer nanoparticle for crop improvement
a) Nanohumus b) Geohumus c) Circot d) Allosperse

II. State whether the following are true or false.

(5x1=5 Marks)

- The gold colloid exhibits varying optical properties.
- Council of scientific and industrial research play a role in nanotechnology research.
- Spectra are range of electromagnetic energy separated by wavelength.
- In transmission electron microscope, electrons are never scattered.
- Mercury and lead are extremely toxic pollutants of water.

III. Complete the following

(5 x 1= 5 Marks)

- The magnetoresistance observed in alternating ferromagnetic and non magnetic layers is called _____.
- _____ used in food packaging do not pose toxicity.
- CARS stands for _____.
- _____ is used as a tip in AFM.
- Chalcogen group contains an element called _____.

IV. Answer the following within 50 words

(5 x 1 = 5 Marks)

- Define nanomaterials.
- List out any two companies which are using nanocomposites.
- Provide Bragg's equation.
- What is source of electrons in TEM?
- Name any two metal based nanoparticles

PART B

Answer the following each within 500 words.

(5 x 8 = 40 marks)

Draw diagrams wherever necessary

21. (a) Discuss the optical and mechanical properties of nanoparticles with examples.

OR

(b) Write an account on semiconducting nanomaterials.

22. (a) Give a brief note on biologically inspired nanomaterials.

OR

(b) What are the toxicity and risks involved in the usage of nanoparticles?

23. (a) Outline the principle and applications of electron spin resonance spectroscopy.

OR

(b) Explain the principle instrumentation behind thermogravimetry.

24. (a) Write about nanocontact printing

OR

(b) Compare photolithography and nanosphere lithography.

25. (a) Explain the role of nanotechnology in tissue and biomaterials engineering.

OR

(b) Give a brief note on siRNA drug delivery and its applications.

PART – C

Answer any TWO of the following, each within 1500 words.

(2 x 20 = 40 Marks)

Draw diagrams wherever necessary.

26. Elaborate on structure, synthesis, properties and applications of carbon nanotubes.

27. Write an essay on theragnostics and Raman spectroscopy.

28. Elaborate on any two microscopic method used to study nanoparticles.

29. Give an account on the role of nanoparticle used in agriculture and add a note on nanoparticle based pesticides.
