



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**M.Sc. DEGREE EXAMINATION – CHEMISTRY**

**THIRD SEMESTER – NOVEMBER 2016**

**CH 3952 - CHEMISTRY OF NANO MATERIALS**

Date: 07-11-2016  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**Part-A**

**Answer ALL questions.**

**(10 × 2= 20)**

1. How are metal nanoparticles synthesized by chemical reduction method?
2. What is meant by nanoimprint lithography?
3. Why are the properties of nanomaterials different from bulk materials?
4. Write the effect of external magnetic field on the para and ferromagnetic materials.
5. What are metal-matrix nanocomposites? Cite an example.
6. Define photon up conversion.
7. Write any four differences between XRD and transmission electron microscope.
8. What happens when electrons interact with sample in electron microscopes?
9. Mention the advantages of nanofluids.
10. What are quantum dots?

**Part-B**

**Answer any EIGHT questions.**

**(8 × 5= 40)**

11. Briefly outline the inert gas condensation method of synthesizing nanomaterials.
12. Discuss the hydrothermal method of synthesizing nanomaterials.
13. Write a short note on the self assembly of nanoparticles using organic molecules.
14. Discuss the following (i) polaritons (ii) surface plasmon polariton resonance
15. How are nanomaterials classified? Give examples.
16. Write the application of quantum dots in biological labeling.
17. How is SWCNT synthesized by laser ablation method?
18. What are dendrimers? How is it synthesized by divergent method?
19. How are bright and dark field imaging techniques operated in transmission electron microscope?
20. Explain the principle of operation of the atomic force microscope.
21. Describe the role of nanomaterials in solar cells.
22. Write the mechanism of Suzuki reaction.

**Part-C**

**Answer any FOUR questions.**

**(4 × 10= 40)**

- 23a. What is meant by nanofabrication? How is replica moulding technique applied in nanofabrication. **(5)**
- b. Explain MOCVD. **(5)**
- 24a. How are nanomaterials synthesized by sol-gel method? **(5)**
- b. What are the differences between direct and indirect bandgap materials? **(5)**
25. Discuss the photonic band gap, defects and types of photonic crystals.
26. What are core-shell nanoparticles? Explain their types with suitable examples. Mention their properties. **(1+5+4)**
27. How do you index a powder XRD pattern of simple cubic crystal system?
- 28a. Define nanofluid. How is it prepared by chemical dispersion method? **(1+4)**
- b. Discuss the application of magnetic nanoparticles in cancer therapy. **(5)**

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