LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **APRIL 2016**

CH 3952 - CHEMISTRY OF NANO MATERIALS

Date: 03-05-2016 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

Part-A

Answer ALL questions. **(10 x 2= 20)**

1. How is gold nanoparticle synthesized by chemical reduction method? Write the chemical reaction.
2. Mention the advantages of hard mould in nanofabrication.
3. Differentiate between Frenkel and Wanier excitons.
4. What is bioluminescence? Give any two biological entities exhibiting bioluminescence.
5. What are metal-matrix nanocomposites? Cite an example.
6. Define 'photon up conversion'.
7. Write the Scherrer equation. Mention its significance.
8. Write a note on phase contrast imaging in transmission electron microscope.
9. What is nanofluid? Why is it important in device cooling?
10. What are quantum dots?

Part-B

Answer any EIGHT questions. **(8 x 5= 40)**

11. Briefly explain arc discharge method of synthesizing nanomaterials.
12. How does replica moulding technique applied in nanofabrication?
13. Describe the templated self- assembly for nanofabrication.
14. Discuss the direct and indirect band gap in semiconductors.
15. What are donors, acceptors and deep traps?
16. Discuss the types of emission in LED and LASER.
17. How is SWCNT synthesized?
18. What are metallodendrimers? Explain the types of metallodendrimers.
19. What happens when electrons interact with a material in SEM analysis?
20. Explain the principle AFM.
21. Discuss the advantages and applications of nanofluids.
22. Write the mechanism of Suzuki reaction.

Part-C

Answer any FOUR questions. **(4 x 10= 40)**

23 a. Describe the sol-gel method of synthesizing nanomaterials. **(5)**

b. What is CVD? Explain LPCVD. **(5)**

24 a. Write short notes on nanoimprint lithography. **(5)**

b. How does ferromagnetic resonance arise in ferromagnetic materials? **(5)**

25. Discuss photonic band gap, defects and types of photonic crystals. **(10)**

26. What are the types of core shell nanoparticles? Explain with suitable examples. Mention its applications. (10)

27. How do you index a powder diffraction pattern of simple cubic crystal system? **(10)**

28 a. Explain the role of nanomaterials in photoelectrochemical decomposition of water. (5)

b. Discuss the application of magnetic nanoparticles in cancer therapy. **(5)**

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