LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **NOVEMBER 2014**

CH 3952 - CHEMISTRY OF NANO MATERIALS

Date : 07/11/2014 Dept. No. Max. : 100 Marks
Time : 09:00-12:00

Part-A

Answer all the questions. Each question carries two marks: ***10x2=20***

1. What is the role of stabilizers in the synthesis of metal nanoparticles?
2. List the advantages of hard mould in nanofabrication.
3. Write the effect of interaction of laser with silver nanoclusters.
4. What is bioluminescence? Give any two biological entities exhibiting bioluminescence.
5. Write the chemical reactions involved in the synthesis of silica nanoparticles.
6. Differentiatebetween clathrate and cavitate.
7. What are bright, dark field, and phase contrast imaging in transmission electron microscope?
8. Compare the thermionic (W, LaB_6) and field emission guns used in electron microscopes.
9. Mention the components of a photovoltaic system.
10. What are quantum dots?

Part-B

Answer any eight questions. Each question carries five marks: ***8x5=40***

11. Explain the synthesis of nanomaterials by inert gas condensation.
12. Write short notes on nanoimprint lithography.
13. Briefly write the templatedself-assemblyof nanofabrication.
14. Discuss thetype of emission in LED and LASER.
15. Write the luminescent behavior of semiconductor nanocrystals.
16. Explain the following. (a) saturation magnetization (b) reminant magnetization

17. Discuss the synthesis of gold nanoparticle by Turkevichmethod. Mention its properties.
18. Write a short note on semiconductor quantum dots of ZnO.
19. Explain the fundamental principle of scanning electron microscopy.
20. Explain the principle of operation of the atomic force microscope.
21. What are nanofluids?List the advantages and applications of nanofluids.
22. Write the mechanism of Suzuki reaction.

Part-C

Answer any four questions. Each question carries ten marks:
4x10=40

23. What is CVD? Discuss the different kinds of CVD techniques.
(3+7)

24. a. Howis replica molding technique applied in nanofabrication.
(5)
b. What are the differences between direct and indirect bandgap materials?
(5)

25. Discuss photonic band gap, defects and types of photonic crystals.

26. a. Howare carbon nanotubes synthesized?
(5)
b. Explain the divergent synthetic methodology of dendrimers.
(5)

27. How is crystallite size determined by XRD? Calculate the crystallite size and d-spacing in nanometer for the following intense XRD peaks (2θ in deg) 38.10, 44.23 and 64.32. The FWHM value for the three peaks is 0.0042 radians. Wavelength of X-rays is 0.1541 nm.

28. a. Describe 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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