



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

**M.Sc. DEGREE EXAMINATION – PHYSICS**

**FOURTH SEMESTER – NOVEMBER 2016**

**PH 4958 - NANO SCIENCE**

Date: 16-11-2016  
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

**Answer ALL Questions**

**PART – A**

**10x2=20**

1. Give an account on nano existence in nature?
2. Write a short note on size dependent properties of nano materials.
3. Define fermi surface in semiconductors.
4. Short list the novel properties of CNTs?
5. Draw flow chart for sol-gel method of nano particle synthesis?
6. Give examples for II-VI semiconductor nano crystals?
7. Differentiate the Electro chemical and photo chemical synthesis of nano crystals.
8. Draw schematic diagram for scanning electron microscope.
9. Write down Debye-Scherrer equation to determine nano-particle size?
10. Outline the significance of nano material as biological tags?

**Answer ALL FOUR Questions**

**PART B**

**4x7.5=30**

11. Distinguish the transition of nano from bulk on size and shape dimensionality.
12. What are excitons? Explain Quantum confinement effect of nanomaterials.
13. Explain the synthesis of nano particles by reverse micelles technique?
14. Outline the significance of impedance measurement on characterization of nano materials.
15. Write a short note on nano materials for photo voltaic device applications.
16. Discuss the efficiency of fuel cells by CNTs?

**Answer ANY FOUR Questions**

**PART C**

**4x12.5=50**

17. With schematic diagram explain intermolecular forces in nano materials with energy band structure.
18. Describe Structural, surface and optical properties of one-dimensional nanomaterials with suitable example.
19. Give in detail structural behaviour of core-shell nano composites.
20. Briefly explain nano particle synthesis by spray pyrolysis method.
21. How do you analyze electronic structure of nano crystals by X-ray photo electron spectroscopy.
22. With suitable examples, explain the organic pollution degradation by nano materials.

\*\*\*\*\*