

**STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2011-12 & thereafter)**

SUBJECT CODE: 11PH/ME/NS63

**B.Sc. DEGREE EXAMINATION APRIL 2015
BRANCH III - PHYSICS
SIXTH SEMESTER**

**COURSE : MAJOR ELECTIVE
PAPER : NANO SCIENCE
TIME : 3 HOURS**

**MAX. MARKS : 100
10X3=30**

Section-A

Answer all Questions:

1. What are one dimensional nanomaterials?
2. What are Fermi surfaces?
3. What are quantum dots? Give an example of quantum dots.
4. What are surface plasmons?
5. Give any two advantages of sol gel synthesis.
6. What do you mean by monodispersity?
7. What is a copper grid?
8. What is meant by photoluminescence?
9. Briefly explain targeted nano-drug delivery.
10. What is Schottky barrier?

Section-B

5X6=30

Answer any Five Questions:

11. Compare the band structure of metals, semiconductors and insulators with necessary diagrams.
12. Why the surface to volume ratio is very large for nanoparticles compared to bulk materials? Explain with simple example.
13. What are fullerenes? Explain the various properties of fullerenes.
14. What is hypothermal synthesis? Explain its advantages.
15. What are the differences between top down approach and bottom up approach in synthesis of nanoparticles.
16. Explain the Bragg's law of diffraction with necessary diagrams.
17. What are solar cells? How are nanomaterials effective in the fabrication of solar cells?

Section-C

2X20=40

Answer any Two Questions:

18. Explain in detail the structural, surface, electronic and optical properties of metal nanoparticles.
19. What is co-precipitation? Explain the synthesis procedure for the same.
20. How do you characterise a material with Transmission Electron Microscopy (TEM) with a neat sketch.
21. What is bio-compatibility? Explain how bio-compatible materials are applied in the field of medicine.

