

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2015-16 and thereafter)
SUBJECT CODE : 15PH/AE/FN45
B.Sc. DEGREE EXAMINATION APRIL 2019
FOURTH SEMESTER

COURSE : ALLIED ELECTIVE
PAPER : FUNDAMENTALS OF NANOSCIENCE
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A

Answer ALL the questions: **(10 x 3 = 30)**

1. What do you mean by NANO? How it is going to revolutionize the world?
2. List any four commercial applications of Nanotechnology?
3. Why [surface area/volume] ratio is very large for nanoparticle, compared to bulk Nano particles?
4. What is the difference between Nanoscience and Nanotechnology.
5. Highlight the properties of CNTs.
6. Give any four tools for characterization of nanomaterials.
7. Can we synthesize metal nanoparticles by bio-technical methods? Why it is preferred?
8. Find the energy gap of Nano CdSe with strong absorption at 420 nm and discuss with its bulk counterpart.
9. Calculate the crystallite size by Scherrer equation, with full width half maxima at $\beta=1.7328$ and Bragg reflection at $\Theta=55^\circ$ with a given source of $\text{CuK}\alpha$ $\lambda=1.7428 \text{ \AA}$.
10. Discuss the application of Nanotechnology in the field of medical sciences.

SECTION – B

Answer any FIVE questions: **(5 x 5 = 25)**

11. Classify nanoscale structures(OD,1D,2D,3D) with necessary diagrams ? Give examples for them.
12. Explain the Quantum size confinement in Nano-sized materials.
13. Elucidate salient features of Nano to its bulk counterpart?
14. Suggest few techniques for the preparation of nanomaterials which could be fast and environmentally benign?
15. Explain the working of scanning electron microscopy (SEM) with a neat sketch?
16. Write a short note on Nano materials for photo-catalytic applications.
17. Define carbon nanotubes ? How many allotropy of carbon do we have ? List methods for producing CNTs ?

SECTION – C

Answer any THREE questions: **(3 x 15 = 45)**

18. Explain SOL-GEL synthesis for producing nanomaterials and discuss its limitations.
19. With neat sketch explain the working of transmission electron microscopy .
20. How are nanomaterials found to be potential materials for the fabrication of solar cells.
21. Discuss in detail CVD technique for synthesis of Nano powders with a neat diagram.
