

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2019-2020 and thereafter)
SUBJECT CODE : 19PH/ME/EN45

B.Sc. DEGREE EXAMINATION APRIL 2022
BRANCH III - PHYSICS
FOURTH SEMESTER

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

SECTION – A

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

1. Brief about nano scale.
2. Name few properties which are affected when there is transition from bulk to nanoscale also define Bohr exciton.
3. What is top-down approach?
4. What are quantum dots?
5. Highlight the properties of CNTs
6. Mention the properties of Au nano particles.
7. What is chemical vapour deposition.
8. State the limitations of TEM.
9. Give any four tools for characterization of nanomaterials.
10. Discuss the application of Nanotechnology in the field of medical sciences.

SECTION -B

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

11. Explain why the bulk properties change at nano scale?
12. Explain the Quantum size confinement in Nano-sized materials
13. Explain any one vapour method approach for the synthesis of nano particles.
14. Explain the working of Photo Luminescence with a neat sketch.
15. Brief about the optical properties of metal nanoparticles.
16. Give a detail account of magnetic nano particles.
17. Explain the ball milling method of preparing nano particles.

SECTION -C

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

18. (i) What are the milestones in the evolution of nanotechnology? What are the challenges faced by researchers in nanotechnology.
(ii) Why surface to volume ratio is very large for nano particles compared to bulk materials? Explain with examples
19. Discuss the essential principle and operation of a TEM with a neat block diagram.
20. Explain the applications of nanotechnology in (a) Agriculture (b) energy (c) aerospace and (d) food packaging.
21. Explain any three chemical approaches for the synthesis of nano particles.
