

**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 2023**  
**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. Why does the band gap increase when decreasing the size of nanostructures?
2. Give any two properties exhibited by metal nanoparticles?
3. Give any two applications of CNT.
4. What is agglomeration? In addition, how it can be minimised?
5. Differentiate hydrothermal and solvothermal synthesis.
6. Explain how structural morphology of nanoparticles is determined.
7. What is bio- compatibility?
8. Explain photocatalysis and its applications.
9. What are the potential risks of nanomaterials to human health and the environment?
10. What is a Nanomedicine?

**SECTION -B**

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

11. Define nanomaterial? Give classification of nanomaterials?
12. Explain briefly the important applications of noble metal nanoparticles.
13. What is annealing? Explain its significance in the hydrothermal synthesis.
14. How do you determine the particle size of the sample using XRD data?
15. Enumerate the applications of CNTs.
16. What are solar cells? How are nanomaterials effective in the fabrication of solar cells.
17. Explain the role of surfactants in the synthesis of nanomaterials.

**SECTION -C**

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

18. Discuss Bottom up approach of synthesis of Nanomaterial.
19. Explain how UV-vis spectrophotometer can be used in sensing of nanomaterial.
20. Define carbon nanotube? What are the types of carbon nanotubes? Highlight the properties of carbon nanotubes?
21. List out applications of Nanomaterials and neatly explain them.