LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc.DEGREE EXAMINATION –**PHYSICS**

FOURTH SEMESTER – **APRIL 2018**

16UPH4ES03– INTRODUCTORY NANO SCIENCE AND NANO TECHNOLOGY

Date: 23-04-2018   Dept. No. 　　　　　　　　 Max. : 100 Marks

Time: 09:00-12:00

PART A

Answer ALL questions **(10x2=20)**

1. Give the various dimensions of nanoscale systems.

2. Mention any two special features of nanomaterials.

3. Write the Hall-Petch equation to find the hardness of nanomaterials.

4. Define Dielectric constant.

5. Give any two advantages of Molecular Beam Epitaxy method..

6. Mention the types of Nanolithography.

7. Draw electron gun assembly of transmission electron microscopy.

8. Is it possible to see nanomaterials by naked eyes? Why not?

9. What is the significance of nanorobot's in medicine?

10. Write a short note on nanobiotechnology.

PART B

Answer any FOUR questions **(4x7.5=30)**

11. Discuss about carbon and metal based nanomaterials.

12. Give a brief note on the dielectric properties of nanomaterials.

13. With a neat diagram explain the chemical vapor deposition (CVD) method of nanomaterials synthesis.

14. Discuss the strength and limitations of scanning electron microscopy.

15. How do nanomaterials act as good energy storage devices?

16. How are quantum computers better than current generation computers?

PART C

Answer any FOUR questions **(4x12.5=50)**

17. Describe the classification of nanomaterials based on their structure with its energy equation.

18. Mention the two main factors that contribute to the exotic optical properties of nanomaterials and explain it.

19. Explain the Sol-Gel method of synthesizing nanomaterials.

20. With a neat diagram explain the working of physical vapour deposition technique?

21. Neatly draw

    a) Basic components of AFM and explain its working. **(6)**

    b) Differentiate between STM and AFM. **(6.5)**

22. Briefly explain how nanomaterials plays vital role in molecular communication and networks.