OC 7/3/24

TB246472S

Reg. No :.....

Name :.....

BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, MARCH 2024

2015, 2016, 2017 ADMISSIONS SUPPLEMENTARY

SEMESTER VI - CORE COURSE (PHYSICS)

PH6B13ATB - Nano Science and Nano Technology

Time : 3 Hours

Maximum Marks : 50

Part A

I. Answer all questions. Each question carries 1 mark (6x1=6)

1. What are micelle and reverse micelle?
2. What is Bragg reflection?
3. What kind of magnetoresistance is shown by CNT and Why?
4. Write an example for ordered and disordered nanostructures.
5. Draw ID and 2D PC structure.
6. Expand the acronyms MEMS and NEMS.

Part B

II. Answer any Seven questions. Each question carries 2 marks (7x2=14)

7. Give two examples to show that magnetic properties vary with size of the particles.
8. What is the significance of nanoscience in modern life?
9. Give the experimental diagram for RF plasma technique.
10. Distinguish between positive and negative resist.
11. Draw the schematic diagram of STM.
12. What are lamellar nanocomposites? Give its classifications.
13. What are the classifications of photonic crystals?
14. Explain the super prism effect.
15. Give a short description of CMR materials.
16. What are the conditions for obtaining magnetoresistance in metals. Give reason.

Part C

III. Answer any Five questions. Each question carries 6 marks (5x6=30)

17. Outline the role of smart structures in industry and medicine.
18. Theoretically prove that blue shift in band gap occurs in all quantum confined structures.
19. How can self organization lead to patterned nanoparticles over a surface?
20. Write an account of nanoimprint lithography.
21. Explain how electron microscopes are used in chemical analysis. What are its merits and demerits?
22. What is the significance of CNT in the fabrication of Computers?
23. Write a short note on features and synthesis techniques for metal nanocluster composite glasses.
24. Write the features of Spin valve Transistors.

PART D

1V. Answer any Two questions. Each question carries 15 marks

25. Explain the classification of CNTs. Also discuss various applications of carbon nanotubes.

26. Explain the formation of defect states. Explain the role of defect states in constructing mirrors, bends, waveguides, splitters and cavity.

27. Using the Fermi gas model, derive equations for density of states of bulk, Q-well and Q-wire. Plot the D(E) and N(E) functions of these three structures and Q-dots.

28. Outline the working of SEM, TEM and AFM. Compare relative merits and demerits.