LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

FIFTH SEMESTER – APRIL 2017

PH 5405- MATERIAL SCIENCE

Date: 02-05-2017   Dept. No.   Max. : 100 Marks
01:00-04:00

PART A
ANSWER ALL QUESTIONS   (10×2=20)

1. Define bond energy and bond length.

2. What are elastomers?

3. Give the power relation between true stress and true strain.

4. Write a note on electrical method of detecting flaws or cracks in metal.

5. Give examples for organic polymers and ceramic materials.

6. Distinguish between hard and soft magnetic materials.

7. List two advantages of SEM.

8. What are crystal imperfections? List out any four.

9. Define space lattice and Basis

10. Distinguish between para-magnetic and ferro-magnetic materials.

PART B
ANSWER ANY FOUR QUESTIONS   (4×7.5=30)

11. Discuss different modes of stability using the mechanical analogy of a rectangular block.

12. Write a note on the various crystal systems.

13. Draw the stress – strain curve for a plastic material and explain the various regions of interest. Why does the experimental result deviate from the theoretical one for large stress?

14. Outline the theory of ferroelectrics using the structure of Barium titanate as example.

15. Draw and explain the working of metallurgical microscope.

PART C

ANSWER ANY FOUR QUESTIONS   **4×12.5=50**

16. Discuss in detail the three important steps involved in the formation of ionic bond with reference to NaCl crystal.

17. Establish Bragg's law of X – ray diffraction. Explain how the law could be used to determine various aspects of crystal structure. Discuss powder method.

18. Discuss in detail rubber like elasticity and obtain the equation of state.

19. Draw the sketch of a scanning electron microscope and discuss its working.

20. What is meant by polarization? What are the different kinds of polarization? Explain their frequency dependence.

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