LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FIFTH SEMESTER – NOVEMBER 2016

PH 5402 / PH 5405 - MATERIALS SCIENCE

Date: 11-11-2016 Dept. No. Max. : 100 Marks
Time: 09:00-12:00

PART A

Answer **ALL** questions: **10 x 2 = 20 marks**

1. Define bond length.
2. Why do solids expand on heating?
3. State Bragg's law of X-ray diffraction.
4. Draw the planes corresponding to Miller indices (1 1 0) (0 1 0).
5. What is Frenkel defect?
6. Define shear modulus.
7. Explain thermoelectric effect method of NDT
8. How are materials classified according to their magnetic susceptibility?
9. What are domains?
10. Mention two essential properties of ferroelectric materials.

PART B

Answer **ANY FOUR** questions: **4 x 7.5 = 30 marks**

11. Explain how the physical properties of materials are influenced by the variation in bonding character.
12. Describe the mechanism of formation of Schottky defect.
13. Explain the stress – strain curve for a plastic material.
14. Discuss the working of a metallurgical microscope with a neat diagram.
15. Write notes on ferro, ferri and antiferro magnetic materials.

PART C

Answer **ANY FOUR** questions: **4 x 12.5 = 50 marks**

16. Demonstrate the different equilibriums of a tilting rectangular block with the necessary potential energy curve.
17. Describe the Bravais lattices of crystal systems with suitable diagram.
18. Explain the working of a scanning electron microscopic with a neat diagram
19. Explain in detail electrical and ultrasonic method of characterising the surfaces by non-destructive testing
20. What is meant by polarization? What are the different kinds of polarization? Explain their frequency dependence with suitable diagram.

****