



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

FIFTH SEMESTER – APRIL 2018

PH 5408- MATERIALS SCIENCE

Date: 08-05-2018
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer **ALL** questions

(10×2=20)

1. Distinguish between primary bond and secondary bond.
2. Define Poisson's ratio
3. Give examples for ceramic materials.
4. Mention the uses of Piezoelectric materials
5. Give examples of Young's modulus of a composite material
6. Draw the structure of Barium titanate(BaTiO_3)
7. Distinguish between X-ray and Gamma ray radiographic methods.
8. Define resolving power of a microscope
9. What are called smart materials?
10. What a note on work hardening?

PART – B

Answer any **FOUR** questions

(4×7.5=30)

11. Discuss the concept of stability using a rectangular block at various tilted positions.
12. Derive the equation of state for a rubbery material
13. Discuss the classification of magnetic materials.
14. Highlight the properties of ferrofluids and their biological applications.
15. Explain the procedure to detect flaws using ultrasonic method with a neat diagram.
16. Draw the stress – strain curve for a plastic material and explain the various regions of interest.

PART – C

Answer any **FOUR** questions

(4×12.5=50)

17. Explain the conditions involved in the formation of ionic bonding and obtain the expression for the total potential energy.
18. Draw the block diagram of a scanning electron microscope and explain its principle, construction and working.
19. What are shape memory alloys (SMA)? Explain the one way and two way memory effect of (SMA).
20. Give a brief account of (a) piezoelectric materials and (b) Dielectric elastomers (DE).
(ii) Discuss the properties of hard and soft magnetic materials. (6+6.5)
21. Draw the stress –strain curve and explain the variations in the elastic/plastic behaviour of the material and derive the power relationship.
22. Explain the different types of polarization and derive the total expression for the total polarization of a material.
