



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**M.Sc. DEGREE EXAMINATION – CHEMISTRY**

THIRD SEMESTER – APRIL 2018

**16PCH3ID01- MATERIALS SCIENCE**

Date: 21-04-2018  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**Part-A**

*Answer ALL questions.*

**(10 × 2= 20)**

1. What do you mean by screw axis?
2. Give the matrix representation for translation and inversion symmetry operation.
3. Define the terms Translucency and opacity.
4. Define slip system in elastic properties of materials.
5. What is meant by dielectric constant of a material?
6. What are intrinsic semiconductors? Give an example.
7. State the principle of photovoltaic cell.
8. Define number average molecular mass of a polymer.
9. State the principle of interfacial polymerization. Give an example.
10. Mention any one method of preparation of nanosized iron oxide.

**Part-B**

*Answer any EIGHT questions.*

**(8 × 5= 40)**

11. Explain the procedure to obtain Miller indices of a crystalline plane.
12. Derive an expression for reciprocal lattice of a crystal plane.
13. Describe the neutron diffraction method in crystal structure analysis.
14. Discuss the Vickers micro hardness method of finding hardness of a material.
15. Explain the principle involved in TGA.
16. Describe ionic polarization in dielectric behavior of a material.
17. Explain the significance of p-n junction in transistors.
18. What are shape memory alloys? Explain their characteristics and any one application.
19. Mention any five differences between hard and soft magnets.
20. Discuss the mechanism involved in the anionic polymerization using butyl lithium as the initiator.
21. What are nanocomposites? Explain any two types of nanocomposites with examples.
22. How is TiO<sub>2</sub> helpful for the splitting of water in Honda cell? Explain.

**Part-C**

*Answer any FOUR questions.*

**(4 × 10= 40)**

23. Explain 3D Bravais lattices of a crystal system with suitable examples and diagrams.
24. Discuss the plastic deformation by slip mechanism.
25. Describe the various types of dielectric breakdown in dielectric material.
26. Why do ferromagnets show spontaneous magnetization? Explain.
27. Explain the processing of polymers by calendaring and die-casting.
28. State the principle of AFM. Explain briefly the imaging modes used with their applications in brief.

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