LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – NOVEMBER 2015

CH 3876 - MATERIAL SCIENCE

Date : 14/11/2015 Dept. No. Max. : 100 Marks

Time : 09:00-12:00

Part-A

Answer ALL questions. **(10 × 2 = 20)**

1. List the two dimensional Bravais lattices.
2. Define screw axis in symmetry operations.
3. State Hooke's law of elasticity.
4. What do you mean by slip system?
5. Obtain the miller indices of the planes (1 1 0) and (0 1 0).
6. What is Frenkel defect? Give an example.
7. Define critical magnetic field.
8. What is the role of p-n junction in rectifiers?
9. Define pyroelectric fusion with an example.
10. State the principle of solvothermal method in the preparation of nanomaterials.

Part-B

Answer any EIGHT questions. **(8 × 5 = 40)**

11. Explain the characteristic features of symmetry elements.
12. Explain briefly the different types of glide planes.
13. Explain the principle and operation of SEM.
14. Discuss the atomic model of elastic behavior of a material.
15. Explain the procedure to obtain reciprocal lattice of a crystal plane.
16. Describe the Czochralski method of crystal growth.
17. What are metal deficiency defects? Explain their types with examples.
18. Discuss the significance of photocatalysts for the splitting up of water.
19. Describe the preparation of gold nanoparticles by Brust reduction.
20. Define piezoelectricity. Explain its applications.
21. Discuss the following :

    a) BCS theory b) Meissner effect.
22. What are shape memory alloys? Explain their characteristics and any one application.

Part-C

Answer any FOUR questions. **(4 × 10 = 40)**

23. Explain the three dimensional Bravais lattices of a crystal system with examples.

24. Describe the Fourier synthesis of crystal structure.

25. Discuss the usage of moduli of elasticity as a parameter in design.

26. Discuss any four types of polarization processes in dielectrics.

27. Define NLO property. Explain any two phenomena involved in NLO.

28. Write a short note on the writing, reading and recording the data using magnets.

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