LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **CHEMISTRY**

SIXTH SEMESTER – **APRIL 2012**

# CH 6608/CH 6602 - CHEMISTRY OF MATERIALS

 Date : 20-04-2012 Dept. No. Max. : 100 Marks

 Time : 1:00 - 4:00

**PART – A**

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

1. Explain the technique “ of single crystal XRD”.

2. Predict the coordination number if the radius ratio is between 0.1 and 0.2.

3. How are xerogels and aerogels prepared?

4. How do missing reflections help to distinguish primitive cubic system from bcc?

5. Define photoconductivity.

6. What type of semiconductor is TiO2? What are its consequences?

7. State Curie-Weis law.

8. What are multi-ferroics? Give an example.

9. What is Meissner effect?

10. What is 123 superconducting oxide?

**PART – B**

**Answer any EIGHT questions: (8 x 5 = 40 marks)**

11. Explain the crystal structure of fluorite.

12. Derive the Bragg equation for the diffraction of X-rays by crystals.

13. Describe the X-ray powder method of analysis.

14. Explain the chemical vapour deposition method.

15. Write a note on differential thermal analysis.

16. What are piezoelectric materials? Mention their applications.

17. Define and explain pyroelectricity. Mention the applications of pyroelectrics.

18. Write a note on permanent and temporary magnets

19. How is magnetic susceptibility of a substance determined?

20. What are type I and type II superconductors?

21. Write a note on reversible lithium solid-state batteries.

22. How does Bardeen Cooper and Schrieffer theory account for superconductivity?

**PART – C**

**Answer any FOUR questions: (4 x 10 = 40 marks)**

23. a) Explain the structure of NaCl. (5)

 b) Define Bravis lattice and explain with an example. (5)

24. Write notes on : a) Zone refining and b) hydrothermal method of crystal growth. (5+5)

25. Discuss the salient features of Frenkel and Schottky defects.

26. Write an explanatory note on various types of liquid crystals.

27. Compare the temperature dependence of paramagnetic, ferromagnetic and

 antiferromagnetic substances. (10)

28. a) Mn3O4 is a normal Spinel whereas Fe3O4 is an inverse Spinel. Offer an explanation. (5)

 b) Write a note on Cheveral phases. (5)

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