 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **CHEMISTRY**

THIRD SEMESTER – **NOVEMBER 2012**

# CH 3875 - MATERIAL SCIENCE

Date : 10/11/2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**PART A**

Answer **all** the questions: 10x2=20

1. With suitable diagrams, explain the formulation of crystal planes and directions.
2. Give examples for applications of single crystals in different fields.
3. What is meant by ultimate strength of a material?
4. Explain how deformation occurs by slip.
5. List the drawbacks of polymers while designing the apparatus.

6. State Meissner effect.

7. What is photovoltaic effect?

8. Mention any two applications of YSZ.

9. Define piezoelectricity.

10. What are domains?

**PART B**

Answer **any eight** questions: 8x5=40

1. What are proper and improper axes? Illustrate their operations.
2. Discuss the neutron diffraction method and what are its limitations?
3. With block diagram explain the working of a TG.
4. Draw the geometry of Czochralski apparatus and outline the experimental procedure for growing crystals by pulling.
5. Distinguish between normal elastic and rubber-like elastic behaviour and obtain the equation of state for rubber.
6. Discuss the procedure for growing crystals in gel by chemical reaction method.
7. Write short notes on the conducting nature of graphite intercalation compounds.
8. Draw and explain the structure of Na+ in β-alumina.
9. What are SMA? Give the characteristics of SMA.
10. What are cheveral phases? Explain.
11. What is p-n junction? Explain any one application of p-n junction?
12. Draw B vs. H loop for ferromagnets and explain.

**PART C**

Answer **any four** questions: 4x10=40

1. Discuss the experimental procedure to record the XRD pattern of a crystalline sample by powder XRD method.
2. Explain the concept of hardness along with various types of hardness measurements.
3. Discuss the atomic model of elastic ehavior with needed diagrams.
4. How is water split photoelectrocatalytically using TiO2?
5. What is NLO? Explain any two phenomena involved in NLO.
6. What are hard and soft magnets? Explain their significance and the differences.

\*\*\*\*\*\*\*\*\*\*