2005-PUNJAB TECHNICAL UNIVERSITY

B.TECH I/II SEMESTER DEGREE EXAMINATION

MATERIAL SCIENCE & ENGINEERING

(MECHANICAL ENGINEERING)

TIME-3HOUR
MARK-60

Note: Section A Is Compulsory. Attempt Any Four Questions From Section B And Any Two From Section C.

SECTION A MARKS 2 EACH

1. (a) Mention the various properties of the materials.

(b) Define grain and grain boundary.

(c) What do you mean by solid solution?

(d) There is no five-fold axis of symmetry. Explain.

(e) What is Schottky defect?

(f) What is mean by polarization in a dielectric material?

(g) What are metallic glasses?

(h) What is meant by magnetostriction?

(i) What do thermosetting polymers mean?

(j) Define the term dielectric breakdown.

SECTION B MARKS 5 EACH

2. State and explain Bragg's law of diffraction. An Ka line x-ray for copper has lambda = 1.54 angstroms. Calculate the maximum number of the order of Bragg's reflection to be observed by a NaCl crystal having spacing of 2.61 angstroms.

3. Discuss the engineering properties of titanium and its alloys. What are different classes of stainless steel? Give the uses of them.

4. Define Hume Rothery rules. Draw and explain the binary phase diagram for Pb-Sn alloy system.

5. What are glass-ceramics? Give examples of a few glass ceramic systems. Discuss the properties and applications of glass ceramics.

SECTION C MARKS 10 EACH

6. What is ferroelectricity? Give examples of five ferroelectric materials. What should be the criteria for a material to become good piezoelectric material?

7. Differentiate the soft and hard magnetic materials. What do you mean by magnetic anisotropy? Explain.

8. What is meant by the degree of polymerization of polymers? Give examples for linear ad three-dimensional polymers.

9. What is mortar? Discuss the properties and uses of mortar.