



B.E./B.Tech (Full-Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2011

Second Semester

Manufacturing Engineering

PH 9164 — PHYSICS OF MATERIALS

(Regulations 2008)

Time: Three Hours

Maximum marks: 100

Answer ALL questions

PART A — (10 x 2 = 20 Marks)

1. State Gibbs phase rule.
2. List various crystal growth techniques.
3. What is the physical significance of a wave function?
4. Sketch the variation of Fermi distribution function with E and T.
5. What are compound semiconductors?
6. Give the principle of operation of the solar cell.
7. Mention any four properties of ferromagnetic materials.
8. Define dielectric loss.
9. What are the steps involved in the fabrication a ceramics?
10. Mention the mechanical properties of metallic glasses.

PART B — (5 x 16 = 80 Marks)

11. i) Draw pressure-temperature diagram for the one component system of iron. (4)
 ii) Briefly discuss various invariant reactions. (12)
12. (a) With a neat diagram, derive an expression for density of states.
Or
 (b) Explain type I and type II superconductors. Give an account on high T_c superconductors and their applications.
13. (a) Describe a method of determining the band gap of a semiconductor. How does electrical conductivity vary with temperature for an intrinsic semiconductor.
Or
 (b) What is Hall effect? Derive an expression for Hall coefficient. Describe an experimental setup for the measurement of Hall coefficient.
14. (a) Distinguish between soft and hard magnetic materials. Write a note on the structure and properties of ferrites.
Or
 (b) Discuss in detail the various dielectric breakdown mechanisms.
15. (a) What are shape memory alloys? Explain their characteristics and applications.
Or
 (b) Describe the methods used to fabricate fiber reinforced plastics.