17/10/13

Roll No. | | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV./ DEC. 2013

Manufacturing Engineering

Semester II

PH9164 –Physics of Materials (Regulation 2008)

Time: 3 Hours Answer ALL Questions Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. State Gibb's phase rule
2. Mention the basic principal of Bridgmann crystal growth method.
3. What is Meissner effect?
4. Mention the physical significance of wave function(ψ)
5. Define Fermi level
6. Define Hall effect and Hall voltage
7. What is domain theory of Ferromagnetism?
8. Name different dielectric breakdown mechanisms
9. What are shape memory alloys?
10. Mention four applications of ceramics.

Part – B (5 x 16 = 80 marks)

11. (i) What are metallic glasses? (2)

    (ii) Discuss in detail about Photo detectors, Bio-sensors, Magnetic Resonance Imaging (14)

12. (a) Explain the eutectic and peritectic phase diagram in detail (16)

    (OR)

    (b) Explain Czochralski method of growing crystal. Mention the merits and demerits.(16)

13. (a) Derive time dependent Schrodinger equation for motion of an electron and hence deduce time independent from it (16).

(OR)

(b) (i) Explain Fermi Dirac distribution for electrons in a metal (6)

(ii) Distinguish type I and type II superconductors and write a note on High T_c superconductors.(10)

14. (a) Explain the mechanism of intrinsic conduction in semiconductors. Derive an expression for conductivity of an intrinsic semiconductor in terms of carrier concentration (16)

(OR)

(b) Obtain the general equation for an impurity semiconductor with the help of charge neutrality equation. Solve the same for small N_d or high temperature and large N_d or low T, in the case of an n-type semiconductor.(16)

15. (a) (i) What are hard and soft magnetic materials? Compare their properties and give Examples (8)

(ii) What are ferrites? Give their properties and applications in the field of Communication and computers. (8)

(OR)

(b) What is meant by local field in a dielectric and how is it calculated for a cubic Structure? Deduce Clausius-Mosotti relation. (16)