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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/ MAY 2014

Manufacturing Engineering

Semester II

PH9164 –Physics for Materials (Regulation 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. State Lever rule
2. Mention the basic principal of solution crystal growth method.
3. What is Isotope effect?
4. Mention the physical significance of wave function(ψ)
5. Define Hall effect and Hall voltage
6. Define Fermi level
7. What is meant by hysteresis loss?
8. Name different dielectric breakdown mechanisms
9. What are metallic glasses?
10. Mention four applications of ceramics.

Part – B (5 x 16 = 80 marks)

11. (i) State Gibbs Phase Rule (2)
(ii) Explain the eutectic and peritectic phase diagram in detail (14)
12. (a) Derive time independent 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)

13. (a) 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)

(OR)

(b) Derive an expression for conductivity of an intrinsic semiconductor in terms of carrier concentration (16)

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

(OR)

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

(ii) Explain Domain theory of ferromagnetism.(8)

15.(a) Discuss in detail (i) Photo detectors (4), (ii) Bio-sensors (4),
(iii) Magnetic Resonance Imaging (4), (iv) Scintillation detectors (4)

(OR)

(b) (i) What are shape memory alloys? (2)

(ii) What are their characteristics, list out any four applications of shape memory alloys (14)