

2013/13

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B.E/B.Tech. (Full Time) Degree End Semester Examinations, APRIL/MAY 2013

9

Branch: MANUFACTURING

Second Semester

PH9164-Physics for Materials

Regulation: 2008

Time: 3 hrs

Max. Mark: 100

Answer All Questions

PART-A (10x2=20 marks)

1. Write Gibbs phase Rule?
2. What is homogeneous and heterogeneous nucleation?
3. Explain Meissner effect?
4. Define Fermi level at 0 K and above 0 K
5. What are intrinsic semiconductors? Give example.
6. Based on band theory how materials are classified?
7. Explain the term dielectric loss.
8. How are the magnetic materials classified?
9. Give the different types of Bio-sensors.
10. What are metallic glasses?

PART-B (5x16=80 marks)

11. Write about the following crystal growth method with neat diagram,
 - i. Czochralski method and (8)
 - ii. Bridgeman method (8)
 12. a) With neat diagram derive an expression for the density of states and based on that calculate the carrier concentration in materials. (16)
- (OR)
- b) i. What is superconductivity? Mention any four property changes that occur and mention two applications (8)

- ii. Explain effect of isotopes on semiconductors. (4)
- iii. Explain the Type I and Type II semiconductors (4)
13. a) i. What is Hall Effect? (2)
- ii. Show that for a p-type semiconductor the Hall coefficient R_H is given by $1/pe$. (6)
- iii Describe an experimental setup for the determination of Hall coefficient and Hall voltage and give two applications of Hall Effect. (8)
- (OR)
- b) Derive an expression for carrier concentration ' n_i ' in intrinsic semiconductors (16)
14. a) i. Deduce Clausius- Mosotti equation and explain its use in predicting the dielectric constant of solids. (10)
- ii. Explain the different polarization mechanisms involved in a dielectric material. (6)
- (OR)
- b) Explain the domain theory of ferromagnetism. (16)
15. a) Write note on:
- i. Computed Tomography Scan (CT Scan) (8)
- ii. Magnetic Resonance Imaging (MRI) (8)
- (OR)
- b) What are shape memory alloys? Explain its principal in detail with an example (16)

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