Question Paper Code : 41647

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Second Semester

Civil Engineering

PH 6251 – ENGINEERING PHYSICS – II

(Common to all Branches except Marine Engineering)

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions.

PART – A   **(10×2=20 Marks)**

1. What are the drawbacks of classical free electron theory ?

2. Define the term Fermi temperature.

3. What is meant by band gap of a semiconductor ?

4. What is a semiconductor ?

5. Write the relation between M, H and χ .

6. Why is a superconductor termed as a perfect diamagnetic ?

7. Give a relation between dielectric susceptibility and polarizability.

8. What are the ferroelectric materials ?

9. Mention the different types of metallic glasses.

10. What is Birefringence ?

PART – B   **(5×16=80 Marks)**

11. a) Using the classical free electron theory, derive the mathematical expressions for the electrical conductivity and thermal conductivity of metals and hence deduce Widemann-Franz Law.   **(6+6+4)**

(OR)

    b) What is density states ? Derive an expression for the density of states. Using density of states, obtain an expression for the carrier concentration in metals.

                                                             (2+7+7)

12. a) Derive the mathematical expressions for the concentration of electrons in the conduction band and the concentration of holes in the valence band and hence obtain the intrinsic carrier concentration. (16)

(OR)

b) What is Hall effect ? Derive an expression for the Hall voltage. Explain an experimental method used to measure the Hall coefficient of a specimen. What are the uses of Hall effect ? (2+6+6+2)

13. a) What are domains ? Discuss the domain concept and hence explain the hysteresis curve. What are hard and soft magnetic materials ? (2+10+4)

(OR)

b) Describe the following applications of superconductors in detail a) Squid b) Cryotron c) Magnetic levitations. (5+5+6)

14. a) What is internal field in solid dielectrics ? Derive a mathematical expression for the internal field in solid dielectrics and hence deduce Clausius-Mosotti equation. (2+10+4)

(OR)

b) What is meant by dielectric breakdown ? Explain the different types of dielectric breakdown. (2+14)

15. a) What are shape memory alloys ? Write about the characteristics of shape memory alloys. Describe the synthesis, properties and applications of Ni-Ti alloys. (3+4+9)

(OR)

b) What are the properties of Nanomaterials ? Describe with neat sketch, the chemical vapour deposition method used to produce Nanomaterials. What are the advantages and drawbacks of this method ? (3+9+4)

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