Question Paper Code: 21004

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2015.

Second Semester

Computer Science and Engineering

01UPH204 - APPLIED PHYSICS

(Common to EEE, ECE, EIE, ICE and IT branches)

(Regulation 2013)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. State Wiedemann - Franz law.

2. Write any two drawbacks of classical free electron theory.

3. The intrinsic carrier density is 1.5×10^{16} m^{-3}. If the mobility of electron and hole are 0.13 and 0.05m^2 v^{-1} s^{-1} respectively, calculate the conductivity.

4. What is Hall Effect? Give any two uses?

5. What are magnetic domains?

6. What is Meissner effect?

7. Define dielectric constant.

8. What is the effect of temperature on polarization?

9. What are metallic glasses? Mention any one of its applications.

10. In a ball mill, steel ball is used as grinding media than porcelain balls, why?

11. (a) Derive an expression for electrical and thermal conductivities of a metal on the basis of classical free electron theory. (16)

Or

(b) (i) Derive the expression for density of states. (12)

(ii) Use the Fermi distribution function to obtain the value of $F(E)$ for $E-E_F = 0.01$ eV at 350K. (4)

12. (a) (i) Obtain an expression for carrier concentration in p-type semiconductor. (10)

(ii) Explain the variation of Fermi level with temperature and impurity concentration in p-type semiconductor. (6)

Or

(b) (i) Derive an expression for Hall coefficient in n-type semiconductors. (10)

(ii) Describe an experimental setup for the measurement of Hall coefficient. (6)

13. (a) (i) Explain the hysteresis on the basis of domain theory. (10)

(ii) Distinguish between soft and hard magnetic materials. (6)

Or

(b) (i) Define superconductivity. Give an account of BCS theory on superconductivity. (10)

(ii) Differentiate between type-I and type-II superconductors. (6)

14. (a) Describe the construction and working of liquid crystal displays. Mention its advantages and disadvantages. (16)

Or

(b) Explain the different types of polarization mechanisms in dielectrics and obtain the expression for electronic polarizabilities. (16)

15. (a) What are metallic glasses? Explain the preparation, properties and write their applications. (16)

Or

(b) Describe the ball milling technique and chemical vapour deposition method for the synthesis of nanomaterials. (16)

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