Reg. No. : | | | | | | | | | | |

Question Paper Code: 41204

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

Second Semester

Computer Science and Engineering

14UPH204 - APPLIED PHYSICS

(Common to Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Information Technology)

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In a metal, if the temperature is increased then resistivity

   (a) increases (b) decreases

   (c) remains same (d) none of these

2. Fermi-Dirac statistics deal with particles of spin

   (a) 0 (b) 1/2 (c) 1 (d) 2

3. For silicon, the energy gap at 300K is

   (a) 1.1 W (b) 1.1 J (c) 1.1 eV (d) None of the above

4. Fermi level of extrinsic semiconductor depends on

   (a) donor element (b) impurity concentration

   (c) temperature (d) all of the above

5. Permanent magnets are made of

   (a) soft magnetic materials (b) hard magnetic materials

   (c) semiconductors (d) superconductors

6. The maglev vehicles are based on the

(a) BCS theory (b) SQUIDS

(c) Meissner effect (d) high temperature superconductor

7. Luminescence is because of

(a) photons emitted while excited electrons drops down

(b) knocking out of electrons by photons

(c) photons stimulated by photons

(d) all of the above

8. Materials which can store electrical energy are called

(a) magnetic materials (b) semiconductors

(c) dielectric materials (d) superconductors

9. The characteristic temperature associated with shape memory alloys are

(a) M_s, M_f, A_s, M_d (b) M_s, M_d, A_s, A_f

(c) M_s, M_f, A_s, A_f (d) M_s, M_d, A_s, A_d

10. The size of nano particle is between

(a) 100 - 1000 *nm* (b) 0.1 - 10 *nm*

(c) 1 - 100 *nm* (d) 0.01 - 1 *nm*

PART - B (5 x 2 = 10 Marks)

11. Define mobility of electrons.

12. How n- type semiconductors are produced?

13. What are ferrites?

14. Give any two applications of thermography.

15. What are nano phase materials?

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the concept of density of energy states. Derive an expression for density of states: using the expression find an expression for Fermi energy level for metals at 0*K*. (16)

Or

(b) (i) Derive an expression for electrical conductivity and thermal conductivity of metals (12)

(ii) State and prove Wiedemann-Franz law. (4)

17. (a) (i) Derive an expression for carrier concentration in intrinsic semiconductors. (12)

(ii) Explain how does the Fermi level varies with respect to temperature in the case of intrinsic semiconductor. (4)

Or

(b) (i) What is Hall effect? Describe an experimental arrangement to measure the Hall coefficient. (12)

(ii) A silicon plate of thickness 1*mm*, breadth 10*mm* and length 100*mm* is placed in a magnetic field of $0.5 wb/m^2$ acting perpendicular to its thickness. If 10^{-2A} current flows along its length, calculate the Hall voltage developed if the Hall coefficient is $3.66 \times 10^{-4}\ m^3/\ Coulomb$. (4)

18. (a) Explain the domain theory of Ferromagnetism. (16)

Or

(b) (i) Distinguish between type I and II superconductors. Give any two applications of superconductors. (10)

(ii) Explain BCS theory. (6)

19. (a) What is meant by internal field? Obtain an expression for internal field. And hence deduce Claussius-Mosotti equation. (16)

Or

(b) Define dielectric breakdown. Explain five types of dielectric breakdown occur in dielectric materials. (16)

20. (a) Explain the characteristics of shape memory alloy and mention its advantages and disadvantages. (16)

Or

(b) (i) Describe plasma arching technique with a diagram to fabricate nano particles. (8)

(ii) Explain how are nanomaterials are synthesized by chemical vapour deposition method. (8)
