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

Question Paper Code: 42004

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Second Semester

Computer Science and Engineering

14UPH204 - APPLIED PHYSICS

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

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The average distance travelled by the electron between any two successive collisions is known as

   (a) relaxation time (b) period (c) mean free path (d) drift velocity

2. The probability of an electron occupying a given energy level is calculated using

   (a) Wiedemann-Franz law (b) Non-degenerate function
   (c) Degenerate function (d) Fermi-Dirac function

3. At very high temperatures, the n type semiconductor behaves like an

   (a) elemental semiconductor (b) intrinsic semiconductor
   (c) extrinsic semiconductor (d) insulator

4. In intrinsic semiconductor at $0K$ Fermi level lies

   (a) Exactly between valence band and conduction band

   (b) Very near to the valence band

   (c) Very near to the conduction band

   (d) None of the above

5. Permanent magnets are made of

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

(c) semiconductors (d) superconductors

6. The superconducting transition temperature of mercury is

(a) 1 *K* (b) 1.14 *K* (c) 4.12 *K* (d) 2.14 *K*

7. Exciton is a

(a) electron-electron pair (b) electron-phonon pair

(c) phonon-hole pair (d) electron-hole pair

8. For a given dielectric, as the temperature increases, the ionic polarizability

(a) increases (b) decreases (c) remains unaltered (d) zero

9. The width of carbon nanotube is_____ *nm*

(a) 1 (b) 1.3 (c) 1.55 (d) 10

10. Nanomaterials are obtained by breaking the bulk solids employing ---------- method

(a) bottom up (b) lithography

(c) molecular beam epitaxy (d) top down

PART - B (5 x 2 = 10 Marks)

11. What are the advantages of classical free electron theory?

12. Define Hall effect.

13. What are the applications of High-T_c Superconductors?

14. What are the factors that affects dielectric loss?

15. What is shape memory alloy?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Define thermal and electrical conductivity of a metal and deduce a mathematical expression for electrical and thermal conductivity of a conducting material. (12)

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

Or

(b) Derive an expression for density of energy states in a conducting material. (16)

17. (a) Derive an expression for the density of electrons in conduction band in an n-type semiconductor and density of holes in valence band in a p-type semiconductor. (16)

Or

(b) What is Hall effect? Derive a Hall coefficient for P-type and N-type semiconductors. (16)

18. (a) (i) Explain Domain theory for ferromagnetic substance and discuss four types of energy involved in domain growth. (16)

Or

(b) List out the important properties of superconducting materials and explain them. (16)

19. (a) Write brief notes on

(i) Phosphorescence (8)

(ii) Fluorescence (8)

Or

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

20. (a) (i) With neat sketch, explain in detail how metallic glasses are manufactured. (12)

(ii) Briefly explain the hysteresis of metallic glasses. (4)

Or

(b) Explain how a nanomaterial is synthesized by chemical vapour deposition technique. (16)