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

Question Paper Code: 41024

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

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. Which condition the Fermi –Dirac distribution function $f(E) = 0^0 K$, at $T = 0^0 K$

   (a) $E < E_F$ (b) $E = E_F$ (c) $E > E_F$ (d) none of these

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. A semiconductor exhibits_____ temperature coefficient of resistance

   (a) zero (b) positive (c) negative (d) constant

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 device which is used to detect magnetic signals from heart and brain

(a) SQUIDS (b) Magnetometer (c) Cryotron (d) Cyclotron

7. Exciton is a

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

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

8. ---------- device reflects light when light is incident on it

(a) LCD (b) LED (c) Solar Cell (d) Photodiode

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. Interpret the variation of Fermi function with temperature.

12. Define Hall effect.

13. Distinguish between hard and soft magnetic materials?

14. What are the factors that affects dielectric loss?

15. Why the metallic glasses are preferred as transformer cores?

PART - C (5 x 16 = 80 Marks)

16. (a) Deduce the Wiedemann - Frantz law from the expression of electrical and thermal conductivity of metals. (16)

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) What are the various types of magnetic materials? With necessary sketches explain the domain theory of ferromagnetism. (16)

Or

(b) (i) Distinguish between type I and type II superconductors. (8)

(ii) Explain the recording and readout of information by magnetic tape. (8)

19. (a) (i) Explain the mechanism involved in twisted nematic crystal display devices and list out their applications. (10)

(ii) Point out the mechanism of optical absorption in metals, semiconductors and insulators. (6)

Or

(b) (i) Derive an expressions for electronic polarisability. (8)

(ii) Explain the frequency and temperature dependence of polarization mechanisms. (8)

20. (a) What are metallic glasses? How they are prepared? Explain their properties and applications. (16)

Or

(b) Explain the synthesis of nanomaterials by plama arcing and solgel methods. (16)

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