B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07PH204: Physics II

Time: Three hours

Maximum Marks: 100

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. Mobility of the electron is
   A. flow of electron /unit electric field
   B. flow of electron /unit magnetic field
   C. reciprocal of conductivity
   D. average electron drift velocity/unit electric field

2. If an electron moves parallel to the magnetic field lines the magnetic force acting on it is
   A. slightly positive   B. slightly negative   C. zero   D. infinity

3. Intrinsic concentration of charge carriers in a semiconductor varies as
   A. $1/T$ B. T C. T^2 D. $T^{3/2}$

4. A Superconducting material when placed in a magnetic field will
   A. attract the magnetic field towards its centre
   B. repel all the magnetic lines of force passing through it
   C. attract the magnetic field but transfer it into a concentrated zones
   D. not influence magnetic field

5. In a dielectric the polarization is
   A. Linear function of applied field
   B. square function of applied field
   C. logarithmic function of applied field
   D. exponential function of applied field

6. In a ferroelectric material the spontaneous polarization vanishes above a certain temperature
   A. transition temperature   B. Curie temperature
   C. Fermi temperature   D. Debye temperature

7. The magnetic induction B and magnetic field intensity H are related by
   A. $B=\mu_0 H$ B. $B=\mu_0 H^2$ C. $B=\mu_0^2 H$ D. $B=\mu_0 \mu_r H$

8. In a ferromagnetic material the susceptibility is
   A. very small and positive   B. very small and negative
   C. very large and positive   D. very large and negative

9. The thickness of the thick film is the order of

    A. 50Å to 20,000Å

    B. 20,000Å to 50,000Å

    C. 50,000Å to 1, 00, 000Å

    D. 1, 25,000Å to 6, 25,000Å

10. Medium Scale Integrated circuits usually contains

    A. less than 5 gates

    B. 10 gates to 100 gates

    C. 100 gates to 1000 gates

    D. more than 1000 gates

PART B (10 x 2 = 20 Marks)

11. Define electrical conductivity.

12. Define work function.

13. Distinguish between intrinsic and extrinsic semiconductors.

14. State the electrical properties of Ge and Si.

15. Define dielectric loss.

16. Distinguish between direct band gap and indirect band gap semiconductors.

17. In a magnetic material the field strength is found to be 10^6 A/m. If the magnetic susceptibility of the material is 5×10^{-5}. Calculate the intensity of magnetization.

18. What are the required qualities of a magnetic storage material?

19. What is the difference between thin film and thick film technologies?

20. What is meant by Masking?

PART C (5 x 14 = 70 Marks)

21. (a) (i) Show that the radius of orbit of a charged particle moving at right angles to the magnetic field are proportional to its momentum   (7)

    (ii) An electron is accelerated through a potential difference of 5 kV and enters a uniform magnetic field of 0.02 wb/m^2 acting normal to the direction of electron motion. Determine the radius of the path.   (7)

(OR)

    (b) (i) What is the force experienced by a charged particle in an electric field and magnetic field?   (7)

    (ii) What is density of states? Derive an expression for it.   (7)

22. (a) (i) Obtain an expression for carrier concentration in an extrinsic semiconductor. (7)

    (ii) How does the Fermi level change with temperature in an extrinsic semiconductor?   (7)

(OR)

(b) (i) What is the significance of critical temperature, critical magnetic field and the critical current density for superconductor? (7)

(ii) Distinguish between Type I and Type II superconductors. (7)

23. (a) (i) Discuss in detail the Electronic and ionic polarization mechanisms involved in a dielectric material. (7)

(ii) Explain the various dielectric breakdown mechanisms. (7)

(OR)

(b) (i) Describe the temperature and frequency dependence of polarization. (7)

(ii) Explain the principle, construction and working of the LCD. (7)

24. (a) (i) State the classification of magnetic materials and explain their Properties. (7)

(ii) Explain the domain theory of ferromagnetism and the types of energy involed in the process of domain growth. (7)

(OR)

(b) (i) Distinguish between soft and hard magnetic materials. (7)

(ii) Explain the action of magnetic bubbles as a magnetic storage. (7)

25. (a) (i) State the important features of the diffusion process. (7)

(ii) How will you fabricate an inductor? (7)

(OR)

(b) (i) Describe the main technologies of fabricating monolithic circuits. (7)

(ii) Discuss the electric field and charge distribution of a metal semiconductor Contact. (7)

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