Register Number: …….

B.E./B.TECH. DEGREE EXAMINATIONS: NOV/DEC 2010

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07PH204: Physics II

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. The minimum amount of heat energy imparted to an electron to make it leave the surface of the material is known as

   a) mobility b) work function c) contact potential d) conductivity

2. The average time taken by a free electron between two successive collisions

   a) collision time b) relaxation time c) fusion time d) drift velocity

3. For intrinsic semi conductor at 0 K, Fermi level lies at

   a) $E_F = \frac{E_V - E_c}{2}$ b) $E_F = \frac{Ec + Ev}{4}$ c) $E_F = \frac{Ec - E_V}{2}$ d) $E_F = \frac{E_c + E_v}{2}$

4. Vortex region appears in

   a) Intrinsic semi conductor b) extrinsic semi conductor

   c) Type II super conductor d) Type I super conductor

5. Materials having permanent dipole moments even in the absence of applied field are called as

   a) para magnetic materials b) polar dielectric materials

   c) non-polar dielectric materials d) dia magnetic materials

6. This breakdown occurs due to attainment of excessive temperature in dielectrics. It is called as

   a) defect break down b) intrinsic breakdown c) thermal breakdown d) discharge breakdown

7. The lagging of magnetization or magnetic induction behind the magnetizing field is called as

   a) coercivity b) retentivity c) hysteresis d) permeability

8. The product of residual magnetic induction and demagnetizing field is called as

   a) energy product b) hysteresis c) magnetic moment d) susceptibility

9. VLSI is abbreviated as

   a) Large Scale Integration b) Very Low Scale integration

   c) Variety Large Scale Integration d) Very Large Scale Integration

10. Masking and etching is the process involved in

a) Fabrication of diodes b) Fabrication of magnets

c) Fabrication of ICs d) Fabrication of dielectrics

PART B (10 x 2 = 20 Marks)

11. Define drift velocity.
12. Define contact potential.
13. Define mobility and conductivity.
14. The super conducting transition temperature of lead is 7.26 K. The initial field at 0 K is 64 x 10^3 ampere/m. Calculate the critical field at 5 K.
15. Distinguish between direct band gap and indirect band gap semi conductor.
16. Define fluorescence and phosphorescence.
17. In a magnetic material the field strength is found to be 10^6 ampere/m. If the magnetic susceptibility of the material is 0.5 x 10^{-5}, calculate the intensity of magnetization and flux density of the material.
18. State any four properties of ferrites.
19. What are monolithic and hybrid ICs?
20. Differentiate between thin film and thick film technology.

PART C (5 x 14 = 70 Marks)

21. (a) Define density of states. Derive an expression for density of free electrons in a metal. Use it to calculate the Fermi energy of a metal at 0 K.

(OR)

(b) (i) State the postulates of classical free electron theory. (7)

(ii) Write a note on electron ballistics. (7)

22. (a) Derive the equation of continuity for holes in p-type semi conductor. Also explain the generation, recombination and mean life of charge carriers.

(OR)

(b) Write short notes on

(i) Meissner effect (2)

(ii) Josephson effect (4)

(iii) SQUIDs and their application (4)

(iv) Magnetic levitation (4)

23. (a) (i) Derive an expression for electronic polarisation. (8)

(ii) Write a note on frequency and temperature dependence on polarisation. (6)

(OR)

(b) (i) What are liquid crystals and state some of their properties. (6)

(ii) With neat diagram explain the action of twisted nematic crystal display. (8)

24. (a) (i) With neat diagram explain domain theory of ferromagnetism in detail. (10)

(ii) Differentiate between hard and soft magnetic materials. (4)

(OR)

(b) (i) Write a note on magnetic bubble memory. (6)

(ii) Write a note on magnetic recording, readouts and storage of data. (8)

25. (a) (i) Explain Czochralski technique for bulk crystal growth. (8)

(ii) Compare and contrast Czochralski and Bridgeman's technique of bulk crystal growth. (6)

(OR)

(b) Explain with neat diagram the different steps involved in the fabrication of monolithic IC and the factors affecting diffusion.

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