Register Number: …………………………

B.E.DEGREE EXAMINATIONS: JUNE 2010

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE102: Electron Devices

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

Answer All Questions:-

PART A (10 x 1 = 10 Marks)

1. The Kinetic energy acquired by an electron when moved through a potential of 3KV is

A. 3 eV B. 30 eV C.300 eV D. 3000 eV

2**.** The path of an electron in a uniform magnetic field is

A. parabolic B. circular C. straight line D. square

3. Intrinsic Semiconductor behaves as a perfect ……… at absolute zero.

A. Conductor B. Dielectric C. Insulator D. Semiconductor

4. When the temperature of extrinsic material increases, the Fermi level position is

A. towards the center of the energy gap B. towards the valence band

C. towards the conduction band D. constant

5. An ideal Ge diode has reverse saturation current of 20μA.Its dynamic resistance for a forward bias of 0.1V is…………

A.26.22Ω B.24Ω C.27.7702Ω D.28.223Ω

6. When temperature increases, the change in reverse saturation current for a Ge diode is ……..

A. Decreased by 8% B. Increased by 11%

C. Decreased by 11% D. Increased by 8%

7. A transistor has typical β of 100.If the collector current is 40mA, what is the value of emitter current?

A.0.4mA B.40.4mA C. 40mA D. 44.4mA

8. Field Effect Transistor is a

A. voltage controlled device B. current controlled device

C. reactance controlled device D. resistance controlled device

9. An UJT has R_{BB}=10KΩ and R_{B2}=3.5KΩ Its Intrinsic-Stand-Off Ratio is

A. 0.65 B. 0.55 C. 0.45 D. 0.75

10. A Triac can be triggered into conduction by applying

A. only positive voltage at the gate

B. positive or negative voltage at the gate

C. positive or negative voltage at either main terminal

D. both A and C above

PART B (10 x 2 = 20 Marks)

11. Why is magnetic deflection preferred to electrostatic deflection in the CRT used in Television?
12. What is Cyclotron? State its use.
13. Draw the energy band diagrams of conductors, semiconductors and insulators.
14. State and explain Mass-action law.
15. Define the term diffusion capacitance and give its expression.
16. What is Zener breakdown?
17. What is early effect?
18. Depletion MOSFET is commonly known as "Normally-ON-MOSFET". Why?
19. Why a photodiode is used in reverse biased condition?
20. Compare SCR with TRIAC.

PART C (5 x 14 = 70 Marks)

21. a) (i) Discuss the motion of an electron under the influence of applied magnetic field. (8)

(ii) An electron moving with initial velocity of 10^6 m/s enters a uniform magnetic field at an angle of 30°with it. Calculate the magnetic flux density required in order that the radius of helical path be 1m.Also, calculate the time taken by the electron for one revolution and pitch of the helix. (6)

(OR)

b) Derive the expression for the deflection in an electrostatic deflection system. Hence obtain the expression for electrostatic deflection sensitivity.

22. a) (i) Derive the electron concentration expression in intrinsic semiconductor. (10)

(ii) In an N type semiconductor, the Fermi level is 0.3 eV below the conduction level at a room temperature of 300 K. Determine the new position of the Fermi level for temperatures of 360K & 400 K. (4)

(OR)

b) Derive the continuity equation from the first principle and also derive three special cases of continuity equation.

23. a) Derive the expression for the current flowing in a PN junction diode in terms of applied potential.

(OR)

b) (i) Explain the current components in a PN diode. (6)

(ii) Explain the switching characteristics of a PN diode. (8)

24. a) (i) Draw the Ebers-Moll model for a PNP transistor. Also give the equations for emitter current and collector current. (6)

(ii) Explain the input and output characteristics of a transistor in CE configuration. (8)

(OR)

b) Explain the construction, operation & characteristics different types of MOSFET with neat diagrams.

25. a) (i) Explain the operation & characteristics of tunnel diode with neat energy band diagrams. (10)

(ii) Compare LED & PN diode. (4)

(OR)

b) (i) Explain the construction, operation & characteristics of SCR with neat diagrams.(10)

(ii) Explain the two transistor analogy of an SCR. (4)

****