Register Number:……..

B.E DEGREE EXAMINATIONS DEC 2012

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE102: Electron Devices

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

Answer ALL Questions:-

PART A (10x1=10 Marks)

1. The charge or quantity of negative electricity of the electron is _____ .

   (a) $0.602x10^{-9}$ C (b) 1.602 C (c) $1.602x10^{-19}$C (d) $1.602x10^{-9}$C

2. Which of the following is called as atom smasher ?

   (a) Trochoid (b) Cycloid (c) Prolate cycloid (d) Cyclotron

3. The transport of charges in a semiconductor is called as_____.

   (a) Conduction (b) diffusion (c) radiation (d) trans conductance

4. The carrier life time of a hole (an electron) range from_____.

   (a) Nano sec – 100 msec (b) equal to 100 msec

   (c) equal to 1 nanosec (d) greater than 100 msec.

5. The thickness of the space charge region of the PN junction is of the order of

   (a) 1 micron (b) 0.1 micron (c) 10 micron (d) 0.01 micron

6. Obtain the dynamic resistance 'r' for η=1, I= 26mA, V_T=26 mV at room temperature T=300^0K

   (a) 1 Ω (b) 0.1 Ω (c) 1K Ω (d) 10 Ω

7. Calculate the Current I_c for a transistor that has α_{dc}= 0.98 and I_B= 100μA.

   (a) 4.9 mA (b) 4.9 A (c) 49 mA (d) 49 A

8. The turn on time t_{on} is given by the following expression

   (a) $t_d - t_r$ (b) t_d (c) t_r (d) $t_d + t_r$

9. A UJT has R_{BB}(min)= 4KΩ, P_D= 180 mw, find max.V_{B1B2}.

   (a) 26.8 V (b) 26.8 mV (c) 0.268 V (d) 268 mV

10. Which of the following diode is called as Esaki diode ?

    (a) Pn diode (b) Zener diode (c) Photo diode (d) Tunnel diode

PART B (20x1=20 Marks)

11. Define electric field intensity and write the equation for force in the direction of electric field.
12. Brief on the force in a magnetic field.
13. State Fermi- Dirac probability function.
14. State Hall effect.
15. Draw the graph for minority carrier density distribution as a function of the distance 'x' from a junction.
16. Define Transition capacitance C_T.
17. Define emitter efficiency.
18. List the advantages of FET over conventional transistor.
19. Draw the V-I characteristics of Tunnel diode and mark the parameters.
20. Define intrinsic stand off ratio.

PART C (5x14=70 Marks)

21. a) (i) Derive the expression for electrostatic deflection sensitivity of a cathode ray tube. (7)

(ii) Obtain the equation for current density of charged particles in a magnetic field. (7)

(OR)

b) (i) Describe the cycloidal path, straight line path and Trochoidal path. (8)

(ii) Explain about Cyclotron with neat diagram. (6)

22. a) (i) Explain the energy band structure of insulator, semiconductor and conductor. (7)

(ii) Explain carrier concentration in an intrinsic semiconductor. (7)

(OR)

b) (i) Describe the conductivity of a semiconductor. (7)

(ii) Obtain the continuity equation of a semiconductor. (7)

23. a) (i) Draw the energy band structure for an open circuited PN junction and write the expression for constant difference of potential . (7)

(ii) Derive the expression for C_D of the PN junction diode. (7)

(OR)

b) (i) Write a short note on varactor diode. (7)

(ii) Explain the VI characteristic of the breakdown diodes. (7)

24. a) (i) Discuss the hole current in the n type base region of the transistor. (7)

(ii) Discuss the Ebers- moll equation of PNP transistor (7)

(OR)

b) (i) Describe operation of the insulated gate FET. (10)

(ii) Obtain the pinch off voltage V_p of JFET. (4)

25. a) Describe the construction, operation & characteristics of the following SCR, TRIAC.(7+7)

(OR)

b) Discuss the operation of the following LED, Photodiode. (7+7)

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