Register Number: ……………………..

B.E DEGREE EXAMINATIONS:MAY/JUNE 2014

(Regulation 2009)

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE102: Electron Devices

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1.   The path of an electron in a uniform magnetic field is
   a)   parabolic   b)   circular
   c)   straight line   d)   square

2.   Coulomb's law is related to
   a)   force between two point charges   b)   magnetic field intensity
   c)   electric field intensity   d)   motion of charged particles

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)   constant   b)   . towards the valence band
   c)   towards the conduction band   d)   towards the center of the energy gap

5.   Zener Breakdown mechanism needs relatively _____ Electric Field compared to Avalanche Breakdown
   a)   Lesser   b)   Greater
   c)   Equal   d)   Infinite

6.   What happens to the capacitance of a varactor diode when the reverse bias voltage across it is increased?
   a)   Barrier potential increases   b)   Depletion layer width increases
   c)   Transition capacitance decreases   d)   All above

7.   A filed-effect transistor (FET) operates on
   a)   Majority carriers only   b)   Minority carriers only
   c)   Positively charged icons only   d)   Both majority and minority carriers

8.   In a CB connection, if the emitter current is 5.80mA & the collector current is 5.6mA then the value of α is
   a)   0.95   b)   0.966
   c)   0   d)   1

9.   Name the bidiretional diode without a control terminal
   a)   PN PN diode   b)   DIAC
   c)   TRIAC   d)   SCR

10.   After triggering an SCR, the gate pulse is removed. The current in the SCR will
   a)   immediately fall to zero   b)   rise up
   c)   remain the same   d)   immediately rise a little and then falls to zero

PART B (10 x 2 = 20 Marks)

11.   Mention the expression for Electrostatic deflection sensitivity.

12.   What is a Cyclotron?

13.   Define Mass – action law.

14.   Show the position of the Fermi level in the case of an n – type semiconductor using energy band diagram.

15.   What is barrier potential?

16.   Explain zener & avalanche break down mechanisms.

17.   Enhancement MOSFET is commonly known as "Normally-OFF-MOSFET". Why?

18.   Define α, β & γ in BJT.

19.   List the important ratings of SCR.

20.   Mention the applications of UJT.

PART C (5 x 14 = 70 Marks)

21.   a)   Explain the Force on a particle and motion of a particle in magnetic field.

(OR)

   b)   (i)   Derive the expression for the frequency of a Cyclotron.   (4)
        (ii) Obtain the relation for Electrostatic deflection sensitivity   (10)

22.   a)   Derive the carrier concentrations in an intrinsic semiconductor.

(OR)

b) (i) Explain how the continuity equation varies with concentration (6)

(ii) What is Hall effect? Derive the relation for hall coefficient? (8)

23. a) (i) Define the term transition capacitance and derive the relation for the same. (6)

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

(OR)

b) (i) Draw the energy band structure of open circuited PN diode and also derive the expression for contact potential V_o. (10)

(ii) Explain the current components of a PN diode. (4)

24. a) (i) Draw the Ebers-Moll model for a PNP transistor. Also derive the equations for emitter current and collector current (8)

(ii) Explain the input and output characteristics of a transistor in CE configuration (6)

(OR)

b) Explain the operation & characteristics of N-channel JFET with neat diagrams. And also mention its two important parameters

25. a) What is Tunneling effect? Explain the operation & characteristics of Tunnel diode with neat energy band diagrams.

(OR)

b) Explain the construction, operation, equivalent circuit, volt ampere characteristics, and application of UJT. Explain about UJT relaxation oscillator

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