Register Number: ……………………..

B.E DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2013)

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U13ECT202: Electron Devices

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. What is the speed of an electron after it has moved through a potential difference of 500V?

    a) 13.28×10^6 m /sec
    b) 33.68×10^5 m /sec
    c) 12.25×10^6 m /sec
    d) 10.31×10^8 m /sec

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

3. 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

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

5. Thermal runaway is not possible in FET because as the temperature of the FET increases:

    a) the mobility decreases
    b) the trans conductance increases
    c) the drain current increases
    d) the mobility increases

6. A transistor has typical β of 100.If the collector current is 40mA, then the value of emitter current is……………….

7. Which of the following statement is correct with respect to photo diode?

    a) Its characteristics are affected by temperature
    b) It is not sensitive to the light
    c) It emits light, when reverse biased
    d) Its dark current is independent of temperature.

8. The ability of SCR to remain conducting, even when the gate signal is removed is known as………….

9. Which of the following monolithic diode is suitable for common cathode diode arrays diffused within a single isolation island?

    a) Collector base diode
    b) Emitter base diode with collector shorted to base
    c) Emitter base diode with collector open
    d) Common cathode array

10. …….method is used for selective removal of Sio_2 in the monolithic technique.

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. Why is magnetic deflection preferred to electrostatic deflection in the CRT used in Television?

12. What is Cyclotron? State its use.

13. The reverse saturation current of a silicon PN diode is 10μA.Determine the diode current for the forward bias voltage of 0.6V at 25°C.

14. What is Zener break down mechanism?

15. Compare BJT and FET.

16. What are the applications of JFET?

17. Construct the two transistor model of SCR.

18. What is a DIAC? Give some applications of DIAC.

19. How the temperature affects the diffusion process?

20. Define large scale integration.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

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

        (ii) Derive the expression for the deflection in an electrostatic deflection system. (8) Hence obtain the expression for electrostatic deflection sensitivity.

22. a) (i)   Derive the continuity equation from the first principle and also derive three (8) special cases of continuity equation.

(ii) Draw the energy band structure of an open circuited PN diode and derive the (6) expressions for E_0 & V_0.

(OR)

b) (i) Define the term transition capacitance and derive the expression for the same. (8)

(ii) Explain the switching characteristics of a PN diode. (6)

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

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

(OR)

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

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

(ii) Compare SCR and TRIAC. (4)

(OR)

b) (i) Explain the construction, operation & characteristics of UJT with necessary (10) diagrams. And also mention its applications.

(ii) Outline the applications of LED diode. (4)

25. a) (i) Discuss in detail about the steps involved in fabricating a monolithic circuit. (8)

(ii) Explain the concept of monolithic integrated circuit transistor. (6)

(OR)

b) (i) Analyze and compare the cross sectional views and equivalent circuits of (10) fabrication of integrated resistors, integrated capacitors and inductors.

(ii) List the advantages of integrated MOSFET. (4)

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