KUMARAGURU
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Register Number: …….

B.E DEGREE EXAMINATIONS: NOV/DEC 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. Velocity of an electron accelerated by an anode voltage of 100V in a CRT is
   a) $59.5*10^{5}$ m/s b) $100*10^{5}$ m/s
   c) $60*10^{5}$ m/s d) $5.95*10^{5}$ m/s
2. The resultant path for an electron entering the magnetic field at an angle θ is ……..
3. Semiconductor diode can be used as
   a) Rectifier b) Amplifier
   c) Oscillator d) Unilateral switch
4. Cut in voltage of a Germanium diode is ……..
5. If a transistor is operating with both of its junctions forward –biased , but with the Collector-Base junction forward bias greater than the Emitter -Base forward –bias, its operating point is in the _____.
   a) Forward active mode b) Reverse saturation mode
   c) Reverse active mode d) Forward saturation mode
6. Slight increase in Collector Current with increase in reverse bias V_{CE} to a transistor is known as ……..
7. In a JFET, at pinch-off voltage applied on the gate
   a) The drain current becomes almost zero b) The drain current begins to decrease
   c) The drain current is almost at saturation value d) The drain-to-source voltage is close to zero volts.
8. The material used for visible LED is ……..

9. In integrated circuits, SiO2 layer provides

a) Physical strength b) Conducting path

c) Electrical connection to external circuit d) Isolation

10. LSI technology includes……..number of gates on chip.

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. Define electrostatic deflection sensitivity.
12. Calculate the kinetic energy acquired by an electron when accelerated by a voltage of 4900 volts.
13. Obtain the factor by which reverse saturation current of a germanium diode is multiplied when the operating temperature increased from 20^oC to 90^oC.
14. List the applications of Zener diode
15. In which region a bipolar junction transistor can act as a switch?
16. Draw the structure diagram of N-channel and P-channel JFET device.
17. How turning on of an SCR is done?
18. Mention the expression for total current I_T of a photo diode with its characteristics.
19. Give the reasons for forming the SiO2 layers in IC fabrication?
20. What is the classification of ICs based on complexity level?

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. Derive the expressions for electrostatic and electromagnetic deflection sensitivity in a CRT.

22. a) With a neat diagram explain the working of a PN junction diode in forward and reverse bias and show the effect of temperature on its VI characteristics.

(OR)

b) Explain the Zener diode characteristics in Reverse biased condition and any one of its application in detail.

23. a) "A depletion mode MOSFET can also be operated in enhancement mode but an enhancement mode MOSFET cannot be operated in depletion mode". Justify.

(OR)

b) Draw the circuit diagram of NPN transistor in Common Emitter (CE) configuration. With neat sketches and necessary equations, describe its static input-output characteristics and clearly indicate the cut-off, saturation& active regions on the output characteristics?

24. a) Draw the typical characteristics for a DIAC. Explain the DIAC operation, and sketch the two circuit symbols used for the device.

(OR)

b) (i) Sketch characteristics for a phototransistor, and explain how the device operates. (8)

(ii) Show how a phototransistor can be used to control the relay. (6)

25. a) Discuss the steps involved in fabricating the monolithic integrated circuit.

(OR)

b) (i) A uniformly doped n-type silicon epitaxial layer of 0.5Ω-cm resistivity is subjected to boron diffusion with constant surface concentration of $5*10^{18}$ cm^{-3}. It is desired to form a p-n junction at a depth of 2.7 µm. At what temperature should this diffusion be carried out if it is to be completed in two hours? (7)

(ii) Describe a lateral p-n-p transistor .Why is its current gain low? (7)

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