KUMARAGURU
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B.E DEGREE EXAMINATIONS: JUNE 2015

(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.   How many Joules does an eV equal to?
   a) 1.60×10^{-19} J   b) 1.60×10^{-29} J
   c) 2.60×10^{-19} J   d) 2.60×10^{-29} J

2.   The force (F) exerted by the charge particle of mass (M) and charge (q) due to applied electric field (E) is
   a) $F = qE$ b) $F = q/E$
   c) $F = E/q$ d) $F = q^2 E$

3.   At room temperature the current in an intrinsic semiconductor is due to
   a)   holes   b)   electrons
   c)   ions   d)   holes and electrons

4.   At very high temperature the extrinsic semi conductors become intrinsic because
   a)   drive in diffusion of dopants and carriers   b)   band to band transition dominants over impurity ionization
   c)   impurity ionization dominants over band to band transition   d)   band to band transition is balanced by impurity ionization

5.   A *p-n* junction diode has
   a)   low forward and high reverse resistance   b)   a non-linear *v-i* characteristics
   c)   zero forward current till the forward voltage reaches cut in value   d)   all of the above

6.   A Varactor diode has
   a)   a fixed capacitance   b)   a fixed inductance
   c)   a voltage variable capacitance   d)   a current variable inductance

7. If for a silicon *n-p-n* transistor, the base to emitter voltage (V_{BE}) is 0.7 V and the collector to base voltage V_{CB} is 0.2 Volt, then the transistor is operating in the

    a) inverse active mode   b) saturation mode

    c) normal active mode   d) cut off mode

8. When an input signal reduces the channel size of JFET, the process is called:

    a) enhancement   b) substrate connecting

    c) gate charge   d) depletion

9. What is the current through the LED?
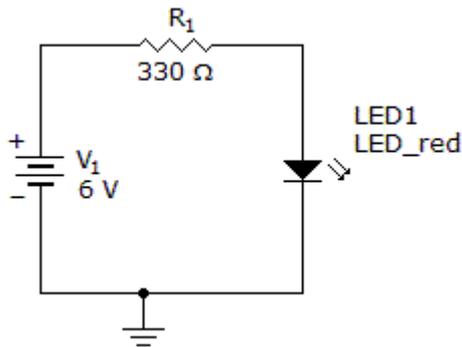
    a) 0 mA   b) 23 mA

    c) 18 mA   d) 13 mA

10. SCR turns off from conducting state to blocking state on

    a) reducing gate current   b) reversing gate voltage

    c) reducing anode current below holding   d) applying *ac* to the gate
        current value

PART B (10 x 2 = 20 Marks)

11. Define electric field intensity.

12. What are the trafactory of a charged particle in a uniform magnetic field?

13. Compare N-type and P-type semiconductors.

14. Define Hall effect.

15. Write the volt-ampere equation for a PN junction diode. Give the meaning of each symbol.

16. Show that a reverse biased PN junction can be used as variable capacitor.

17. Define the three operating regions of bipolar junction transistor.

18. Which device is called as unipolar device? Why?

19. Summarize the applications of UJT.

20. Draw the equivalent circuit of SCR.

PART C (5 x 14 = 70 Marks)

21. a) Derive the deflection sensitivity of electrostatic deflection system.

(OR)

    b) Explain the motion of charge particle in uniform electric field.

22. a) Explain the formation of P-type and N-type semiconductors from the pure form of semiconductors.

(OR)

    b) i) Compare the energy band structure of conductor, semiconductor and insulator. (6)

       ii) Compare drift current and diffusion current. (8)

23. a) Discuss the operation of a PN junction diode under open circuit, forward bias and reverse bias condition.

(OR)

    b) i) Differentiate Zener breakdown and Avalanche breakdown. (6)

       ii) Explain the working of varactor diode. (8)

24. a) Discuss constructional details, operation, characteristics and advantages of JFET.

(OR)

    b) What are the two types of BJT and explain their principles of operation.

25. a) Explain the construction and operation of UJT with its equivalent circuit and emitter characteristics.

(OR)

    b) Explain the construction, working principle and V-I characteristics of TRIAC.

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