



Register Number:

B.E DEGREE EXAMINATIONS: DEC 2014

(Regulation 2009)

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE102: Electron Devices

Time: Three Hours

Maximum Marks: 100

Answer ALL Questions

PART A (10 x 1 = 10 Marks)

1. The movement of free electrons in a conductor is called
(a) Voltage (b) Current (c) recombination (d) equilibrium
2. Effectively, how many valence electrons are there in each atom within a silicon crystal?
(a) 2 (b) 4 (c) 8 (d) 16
3. Which statement best describes an insulator?
(a) A material with many free electrons
(b) A material doped to have some free electrons.
(c) A material with few free electrons.
4. An n-type semiconductor material
(a) is intrinsic (b) has trivalent impurity atoms added
(c) has pentavalent impurity atoms added (d) requires no doping
5. You have an unknown type of diode in a circuit. You measure the voltage across it and find it to be 0.3 V. The diode might be
(a) a silicon diode (b) a germanium diode
(c) a forward-biased silicon diode (d) a reverse-biased germanium diode
6. A diode conducts when it is forward-biased, and the anode is connected to the _____ through a limiting resistor
(a) positive supply (b) negative supply
(c) cathode (d) anode

7. For normal operation of a pnp BJT, the base must be _____ with respect to the emitter and _____ with respect to the collector
- (a) positive, negative (b) positive, positive
(c) negative, positive (d) negative, negative
8. Which of the following is true for an npn or pnp transistor?
- (a) $I_E = I_B + I_C$ (b) $I_B = I_C + I_E$ (c) $I_C = I_B + I_E$ (d) $I_C = I_B - I_E$
9. LEDs are made out of
- (a) silicon (b) germanium
(c) gallium (d) silicon and germanium, but not gallium
10. A tunnel diode is used
- (a) in high-power circuits (b) in circuits requiring negative resistance
(c) in very fast-switching circuits (d) in power supply rectifiers

PART B (10 x 2 = 20 Marks)

11. Give the value of Charge, Mass of an electron.
12. What is cyclotron?
13. Differentiate between intrinsic and extrinsic semiconductor.
14. What is meant by drift and diffusion current?
15. What is depletion region in PN junction?
16. Write the applications of PN junction diode.
17. Draw the symbol of NPN and PNP transistor.
18. Define the h – parameters of a transistor in CE configuration.
19. What is a TRIAC?
20. Give the advantages and disadvantages of tunnel diode.

PART C (5 x 14 = 70 Marks)

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

(OR)

- (b) Derive and Explain the Electrostatic deflection sensitivity in CRT and magnetic deflection sensitivity in CRT.

22. (a) Explain Insulator, Semiconductor & conductor with the help of energy band structure.

(OR)

(b) (i) Explain the following (a) Mobility (b) Conductivity. (4)

(ii) What is Hall effect? Derive the relation for hall coefficient. (10)

23. (a) (i) Explain the characteristics and applications of zener diode. (7)

(ii) Explain the mechanism of avalanche and zener break down. (7)

(OR)

(b) Explain the characteristics and applications of Varactor diode.

24. (a) (i) Explain the operation of NPN transistors. (8)

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

(OR)

(b) Explain the operation of JFET and the drain and transfer characteristics.

25. (a) Explain the construction, operation, equivalent circuit V-I characteristics and application of UJT.

(OR)

(b) Explain the construction, operation, V-I characteristics and application of SCR and explain its two transistor model.
