

ELECTRONIC DEVICES & CIRCUITS

(Common to EEE, ECE & EIE)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define intrinsic semi conductor, write example.
 - What are the basic applications of conventional and Zener diode?
 - Write the formula for β in terms of α , and in terms of γ of a NPN transistor.
 - For a transistor α is 0.99, what is β ?
 - List out the types of biasing techniques.
 - Define thermal runaway.
 - Draw the h-parameter model of CE mode.
 - Write the typical values of h_{ie} , h_{fe} , h_{re} & h_{oe} .
 - Define thyristor family.
 - Draw the symbols of UJT and Tunnel diode.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) The leakage current through Germanium diode is $I_0 = 25 \mu\text{A}$, if the forward bias of $V_f = 0.2 \text{ V}$, Calculate the static resistance.
- (b) What are the various breakdown mechanisms? Explain one in detail.

OR

- 3 The Half wave rectifier circuit is supplied with a 230 V AC through 3:1 step down transformer with a resistive load of 10 K Ω , the diode forward resistance is 75 Ω and transformer secondary winding resistance 10 Ω . Calculate V_m , I_m , I_{av} , V_{av} and P_{DC} .

UNIT – II

- 4 (a) Write the current components of PNP transistor and explain.
- (b) For a transistor the leakage current is 0.1 μA in CB configuration, while it is 19 μA when it is connected in CE configuration. Calculate α and β of the same transistor.

OR

- 5 Draw and explain construction and operation of Enhancement mode MOSFET with its characteristics.

UNIT – III

- 6 Draw the BJT self bias circuit and derive equations for I_B , I_C and V_{CE} .

OR

- 7 (a) In a fixed bias circuit a Si transistor with $\beta = 100$ is used, $V_{CC} = 6 \text{ V}$, $R_C = 3 \text{ K}\Omega$, $R_B = 530 \text{ K}\Omega$. Draw the DC load line, determine the Q point, What is the stability factor?
- (b) What are the advantages of self bias over other biasing techniques?

UNIT – IV

- 8 For a CE amplifier circuit $R_S = 1 \text{ K}\Omega$, $R_1 = 50 \text{ K}\Omega$, $R_2 = 2 \text{ K}\Omega$, $R_C = 1 \text{ K}\Omega$, $R_L = 1.2 \text{ K}\Omega$. Construct small signal equivalent model and Calculate A_i , A_v , R_i and R_i' .

OR

- 9 (a) State and explain Millers theorem.
- (b) A Common Emitter amplifier with collector to Base bias having $R_S = 10 \text{ K}\Omega$, $R_f = 200 \text{ K}\Omega$ and $R_C = 10 \text{ K}\Omega$. Calculate A_i , R_i , A_v . and R_i' .

UNIT – V

- 10 With neat diagrams, explain the construction and operation of SCR with its characteristics

OR

- 11 Draw and explain the construction and operation of UJT
