Code: 13A04301 **R13**

B.Tech II Year I Semester (R13) Supplementary Examinations June 2016

ELECTRONIC DEVICES & CIRCUITS

(Common to EEE, ECE & EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define intrinsic semi conductor, write example.
(b) What are the basic applications of conventional and Zener diode?
(c) Write the formula for β in terms of α, and in terms of γ of a NPN transistor.
(d) For a transistor α is 0.99, what is β?
(e) List out the types of biasing techniques.
(f) Define thermal runaway.
(g) Draw the h-parameter model of CE mode.
(h) Write the typical values of h_{ie}, h_{fe}, h_{re} & h_{oe}.
(i) Define thyristor family.
(j) 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 Io = 25 µA, if the forward bias of V_f = 0.2 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 KΩ, 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 β = 100 is used, V_{CC} = 6 V, R_C = 3 KΩ, R_B = 530 KΩ. 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 KΩ, R_1 = 50 KΩ, R_2 = 2 KΩ, R_C = 1 KΩ, R_L = 1.2 KΩ. 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 KΩ, R_f = 200 KΩ and R_C = 10 KΩ. 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

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