Code: 13A04301 **R13**

B.Tech II Year I Semester (R13) Supplementary Examinations June 2017

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) How Fermi level moves while converting intrinsic semiconductors into extrinsic semiconductors?
(b) Why harmonic components effect is less in full wave rectifier than in half wave rectifier?
(c) Common collector is also called as “emitter follower”. Justify it?
(d) Define pinch-off voltage & write an equation for it.
(e) What is the difference between transistor compensation & stabilization?
(f) Briefly explain causes & consequences of thermal runaway in BJT.
(g) Why BJT is modeled with h-parameters but not with Z/Y-parameters?
(h) Draw small signal model of JFET.
(i) How LED works?
(j) What is meant by Thyristors? And write about well-known two thyristor devices.

PART – B

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

UNIT – I

2 Explain temperature dependence of V-I characteristics in PN junction diode.

OR

3 Draw the full wave rectifier with π-section filter & explain its operation along with derivation for ripple factor.

UNIT – II

4 Write BJT specifications in detail.

OR

5 (a) Compare & contrast BJT & FET.
(b) Draw and explain the drain characteristics of P-channel Enhancement type MOSFET.

UNIT – III

6 What are the drawbacks in fixed bias? How they are eliminated in self bias? Explain this with required circuit diagrams & equations.

OR

7 What are the techniques of bias compensation in BJT? And explain at least 3 techniques.

UNIT – IV

8 Derive input impedance, output impedance, current gain & voltage gain for CB & CC using simplified hybrid model.

OR

9 The h-parameters of a transistor used in a CE circuit are h_{ie} = 1 kΩ, h_{re} = 10 x 10^{-4}, h_{fe} = 50 and h_{oe} = 100 μA/V. The load resistance for the transistor is 1 kΩ. Determine R_i, R_o, A_V, A_I in the amplifier stage using both exact analysis & approximate analysis. Assume R_s = 1000 Ω.

UNIT – V

10 (a) Explain the construction & operation of UJT.
(b) Discuss two transistor version of SCR.

OR

11 Sketch and explain the volt-ampere characteristics of a tunnel diode.

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