Code: 13A04301 **R13**

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015

ELECTRONIC DEVICES AND 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)

(a) Define transformer utilization factor.
(b) Define mass action law.
(c) Define amplification factor.
(d) What is pitch-off voltage?
(e) What is DC load line?
(f) Write the relation between S and S'.
(g) Draw the h-parameter equivalent circuit for transistor.
(h) Define input impedance.
(i) State any two applications of LCD's.
(j) State the disadvantages of LED.

PART – B

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

UNIT - I

2 Draw and explain the energy band diagrams for extrinsic semiconductor.

OR

3 Explain the working of bridge rectifier. Give the expressions for RMS current, PIV, ripple factor and efficiency.

UNIT - II

4 Explain with the help of neat diagram the structure of an N-channel FET. In what ways it is different from a bipolar transistor.

OR

5 (a) Sketch and explain a family of CB output characteristics for a transistor.
(b) Indicate the active, cut-off and saturation regions. Explain the shapes of the curves qualitatively.

UNIT - III

6 (a) Derive the expression for I_C versus I_B for a CE transistor configuration in the active region.
(b) For $I_B = 0$, what is I_C.

OR

7 In the voltage divider bias circuit, if V_{CC} = 10 V, V_{CE} = 5 V, I_C = 1.2 mA, R_2 = 10 kΩ, β = 100 and R_E = 270Ω calculate R_1 and R_3. Assume $V_{BE\ (active)}$ = 0.6 v.

UNIT - IV

8 (a) Derive the expression for A_V in terms of A_I.
(b) In terms of the h parameters and the source resistance, derive the equation for the output admittance.

OR

9 Find h_{re} in terms of the CB h parameters.

UNIT - V

10 Sketch and curve of photodiode current as a function of the position of a narrow light source form the junction. Explain the shape of the curve.

OR

11 Sketch and explain the characteristics of the tunnel diode.

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