B.Tech II Year I Semester (R15) Supplementary Examinations June 2017

ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, ECE and 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) Differentiate drift and diffusion currents?

(b) What is the operating principle of LED? Which colour of light is emitted by GaAs, Gp, GaAsp?

(c) Discuss briefly about different filters.

(d) Explain diode rectifier for power supply.

(e) Explain the transistor operation with the help of four regions.

(f) Write the differences between JFET & BJT.

(g) What is the basic difference between bias compensation and stabilization?

(h) If a transistor has α of 0.97, find the value of β. If β = 200, find the value of α.

(i) Why we use h-parameters to describe a transistor?

(j) Explain base width modulation of a transistor.

PART – B

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

UNIT – I

2 (a) Give diode current equation. Mention any two applications of a diode.

(b) Explain the operation of LCD. Mention its applications.

OR

3 (a) Discuss about V-I characteristics of tunnel diode with help of Fermi level diagram.

(b) Discuss diode capacitances with the help of equations.

UNIT – II

4 (a) A 50 Ω load resistance is connected across a half wave rectifier. The input supply voltage is 230 V (rms) at 50 Hz. Determine the DC output (average) voltage, peak-to-peak ripple in the output voltage (Vp-p), and output ripple frequency (fr).

(b) Explain full wave rectifier with capacitor filter and derive expression for capacitor.

OR

5 (a) In the full-wave rectifier circuit, the transformer has a turns ratio of 1:2. The transformer primary winding is connected across an AC source of 230 V (rms), 50 Hz. The load resistor is 50 Ω. For this circuit, determine the DC output voltage, peak-to-peak ripple in the output voltage, and output ripple frequency.

(b) Explain the working principle of Bridge rectifier with derivations. Differentiate with Full Wave Rectifier.

UNIT – III

6 (a) Explain in detail about the Ebers Moll model. Describe base spread resistance.

(b) Explain the operation of JFET. Write some applications for JFET.

OR

7 (a) Explain the operation of BJT. Give the relationship between $\alpha, \beta \text{ and } \gamma$ of a transistor.

(b) Compare MOSFET with JFET.

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UNIT – IV

8 (a) What is DC load line and AC load line? Explain the criteria for fixing operating point.
(b) Discuss about self bias circuit and derive expression for stability factor.

OR

9 (a) Discuss about collector to base bias circuit and derive expression for stability factor.
(b) Briefly explain about FET biasing.

UNIT – V

10 (a) Describe the determination of h-parameters of a transistor.
(b) Draw the basic CE amplifier circuit and its equivalent h-parameter model. Derive an expression for its Ri and Ro.

OR

11 (a) Draw the CS amplifier with self-bias and bypass resistor Rs. Derive the expressions for Ri, Av, Ro, using its equivalent circuit.
(b) Explain about relation between h-parameters of CE, CB, CC configurations.

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