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. 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 $\alpha, \beta\ and\ \gamma$ of a transistor.
    (b) Compare MOSFET with JFET.

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$\boxed{\text{UNIT – IV}}$

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.

$\boxed{\text{UNIT – V}}$

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 R_i and R_o.

OR

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

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