Total No. of Questions—**8**] [Total No. of Printed Pages—**2**

Seat No.	

[5559]-133

S.E. (E & TC/Electronics) (I Sem.) EXAMINATION, 2019
ELECTRONIC DEVICES AND CIRCUITS
(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Attempt Q. No. **1** *or* **2**, Q. No. **3** *or* **4**, Q. No. **5** *or* **6**, Q. No. **7** *or* **8**.
(*ii*) Neat diagrams must be drawn wherever necessary.
(*iii*) Figures to the right indicate full marks.
(*iv*) Use of Calculator is allowed.
(*v*) Assume suitable data, if necessary.

1. (*a*) Draw a neat circuit diagram of Self-bias circuit. Derive the expression for V_{CEQ} and I_{CQ}. [6]

(*b*) The transistor is connected in CE amplifier with bypassed R_E has R_1 = 50 kΩ. R_2 = 2 kΩ, R_C = 1 kΩ, R_S = 1 kΩ. R_L = 10 kW. Also *h*-parameters h_{ie} = 1.1 kΩ, h_{fe} = 50, h_{oe} = 24 μA/V, h_{re} = 2.5 × 10^{-4}. Determine the value of A_v, A_{vs}, A_l, R_i'. [6]

Or

2. (*a*) Explain in detail the three factors which contribute to thermal instability ? [6]

(*b*) Define hybrid parameters of CE configuration of BJT with formulas. Draw its hybrid equivalent circuit for CE configuration. [6]

3. (*a*) Define and derive expression for f_α, f_β and f_T. [6]

(*b*) Draw and explain the circuit diagram of Hartley Oscillator using BJT and give expression for frequency of oscillation. [6]

P.T.O.

Or

4. (*a*) Draw and explain CE short circuit current gain using Hybrid-π model. [6]

(*b*) In Hartley Oscillator L_1 = 15 mH, C = 50 pF. Calculate L_2, for frequency of 168 kHz. [6]

5. (*a*) Explain the following parameters of power BJT : [6]

(*i*) Safe operating area

(*ii*) Thermal resistance.

(*b*) Draw circuit diagram of class B push pull amplifier and explain its operation with neat waveforms. [7]

Or

6. (*a*) What is crossover distortion ? How is it reduced in complementary symmetry class AB amplifier ? [6]

(*b*) A class B push pull amplifier is supplied with V_{CC} = 12 V and load resistance of 5 Ω. If input is sinusoidal, calculate : (*i*) Maximum power output (*ii*) Power dissipation in both transistors, (*iii*) Power dissipation in each transistor, (*iv*) percentage efficiency. [7]

7. (*a*) Draw and explain Bi-CMOS inverter. [6]

(*b*) Explain various non-ideal current voltage characteristics of EMOSFET. [7]

Or

8. (*a*) The parameters of NMOSFET are k = 0.2 mA/V^2, λ = 0.01 V^{-1}, V_T = 1.2 V. Calculate output resistance for (*i*) V_{GS} = 2 V, (*ii*) V_{GS} = 4 V. [6]

(*b*) Draw and explain constant current source biasing circuit for EMOSFET. [7]