

**S. E. 2012 (E&TC/Electronics)204182****Electronic Devices and Circuits****(Semester - I)****Time: 2 Hours****Max. Marks : 50****Instructions to the candidates:**

- 1) Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of Calculator is allowed.
- 5) Assume Suitable data if necessary

Q1)	a)	Explain what is meant by Thermal Runaway in BJT circuits.	[6]
	b)	The transistor is connected in CE amplifier with bypassed $R_E$ has $R_1 = 50 \text{ K}\Omega$ , $R_2 = 2 \text{ K}\Omega$ , $R_C = 1 \text{ K}\Omega$ , $R_S = 1 \text{ K}\Omega$ , $R_L = 10 \text{ K}\Omega$ . Also h-parameters are $h_{ie} = 1.1 \text{ K}\Omega$ , $h_{fe} = 50$ , $h_{oe} = 24 \text{ }\mu\text{A/V}$ , $h_{re} = 2.5 \times 10^{-4}$ . Determine the value for $A_v$ , $A_i$ , $R_i$ ' and $R_o$ '.	[6]
		<b>OR</b>	
Q2)	a)	Determine the operating point and draw DC and AC Load Line if $V_{CC} = 12 \text{ V}$ , $R_1 = 8 \text{ K}\Omega$ , $R_2 = 4 \text{ K}\Omega$ , $R_E = 1 \text{ K}\Omega$ , $R_C = 1 \text{ K}\Omega$ , $R_L = 1.5 \text{ K}\Omega$ . Assume $V_{BE} = 0.7 \text{ V}$ .	[6]
	b)	Compare CE, CB and CC amplifier performance parameters.	[6]
Q3)	a)	Draw hybrid $-\pi$ CE Amplifier model at high frequency. Explain significance of each parameter.	[6]
	b)	An amplifier has gain of 60 and distortion is 10 % without feedback. Determine: (i) Gain, (ii) Distortion, when negative feedback is applied. Assume feedback factor as 0.1	[6]
		<b>OR</b>	
Q4)	a)	Explain the effect of Emitter bypass capacitor on low frequency response of BJT amplifier.	[6]
	b)	Explain RC Phase Shift Oscillator using BJT and determine the output frequency for $R = 1 \text{ K}\Omega$ , $C = 0.01 \text{ }\mu\text{F}$ .	[6]
Q5)	a)	In a Class A amplifier $V_{CE(\text{max})} = 25 \text{ V}$ , $V_{CE(\text{min})} = 5 \text{ V}$ . Find the overall efficiency for: (i) series fed load, (ii) transformer load.	[6]
	b)	With the help of neat circuit diagram, explain the operation of Class AB power amplifier. Explain the significance of Class AB.	[7]
		<b>OR</b>	
Q6)	a)	Draw and explain Transformer coupled Audio Power Amplifier. Derive the expression for its efficiency.	[6]
	b)	A Class B push pull amplifier is supplied with $V_{CC} = 50 \text{ V}$ . The signal swings the collector voltage down to $V_{\text{min}} = 10 \text{ V}$ . The total power dissipation in both transistors is 40 W. Find: i) $P_{\text{in}(\text{dc})}$ , ii) $P_{\text{o}(\text{ac})}$ , iii) % $\eta$ .	[7]
Q7)	a)	Describe the internal capacitance and high frequency model of MOSFET.	[6]
	b)	E-MOSFET biased in CS configuration has following parameters: $R_1 = 10 \text{ M}\Omega$ , $R_2 = 6.8 \text{ M}\Omega$ , $R_D = 2.2 \text{ k}\Omega$ , $V_{DD} = 24 \text{ V}$ , $V_T = 3 \text{ V}$ , $I_{D(\text{ON})} = 5 \text{ mA}$ , $V_{GS(\text{ON})} = 6 \text{ V}$ . Determine the values for $I_D$ and $V_{DS}$ .	[7]
		<b>OR</b>	
Q8)	a)	Enlist biasing of EMOSFET in common source configuration and explain any one of them in detail.	[6]
	b)	Explain various non-ideal current voltage characteristics of EMOSFET.	[7]