

Duration: 3hrs

[Max Marks:80]

- N.B. : (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

1 Attempt any FOUR

[20]

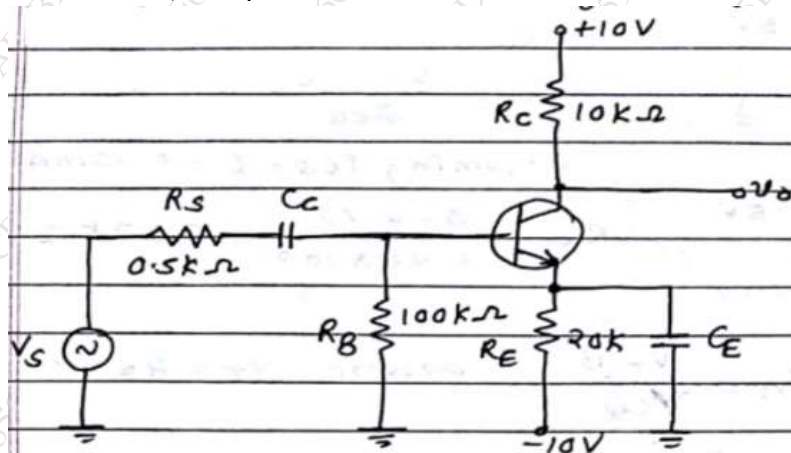
- a State and explain Miller's Theorem.
- b Draw and explain working of EMOSFET with suitable diagram.
- c Differentiate Small Signal Amplifier and Large Signal Amplifier
- d Explain the concept of DC load line, Q point and region of operation with suitable diagram.
- e Draw frequency response of single stage CE amplifiers showing effect of various capacitors.

2 a Explain classification of power amplifier. Explain analysis of any power amplifier with diagram.

[10]

- b For given circuit diagram determine small signal voltage gain, input resistance and output resistance. (Take $\beta=100$, $V_A=100$)

[10]



3 a Explain high frequency response of CS (E-MOSFET) amplifier.

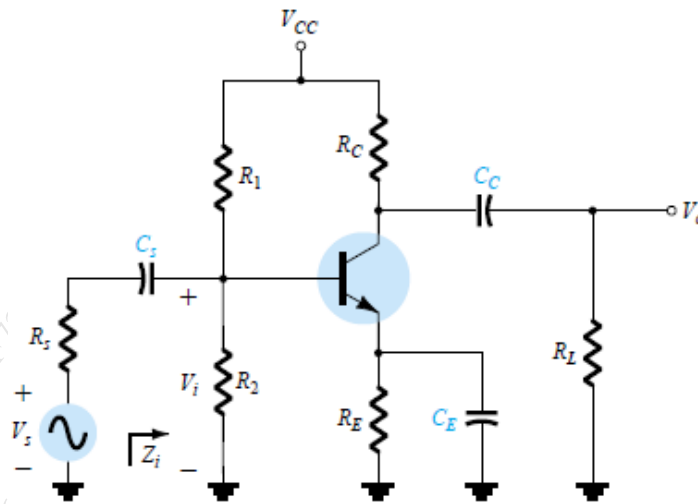
[10]

- b Design a class A transformer coupled power amplifier for the following requirements: Output A.C. power = 5 watts, Load resistance = 12 ohms, DC supply voltage = 12 volts $SICO \leq 8$. Calculate overall efficiency at full load.

[10]

- 4 a Derive expressions for Z_i , Z_o , A_v and A_i of CE Amplifier using hybrid pi Model. [10]

b [10]



Determine the lower cutoff frequency for the network of Fig. 11.16 using the following parameters:

$$C_s = 10 \mu\text{F}, \quad C_E = 20 \mu\text{F}, \quad C_C = 1 \mu\text{F}$$

$$R_s = 1 \text{ k}\Omega, \quad R_1 = 40 \text{ k}\Omega, \quad R_2 = 10 \text{ k}\Omega, \quad R_E = 2 \text{ k}\Omega, \quad R_C = 4 \text{ k}\Omega, \\ R_L = 2.2 \text{ k}\Omega$$

$$\beta = 100, \quad r_o = \infty \Omega, \quad V_{CC} = 20 \text{ V}$$

- 5 a Draw and explain DC transfer characteristics of MOSFET. Explain operation of E-MOSFET with differential mode signal mode.. [10]
- b Draw and explain Small signal analysis of CS (EMOSFET) amplifiers. [10]
- 6 a State different types of Coupling in multistage amplifiers with suitable diagrams and explain any one coupling method with its advantages and disadvantages. [10]
- b Derive equation for Differential mode gain, Common mode gain and CMRR for MOSFET differential amplifier using small signal analysis. [10]
