

Time: 3 hour

Max. Marks: 80

Q1 is compulsory. Attempt any three from Q2 to Q6.

Q1 5 marks each

- A What is a short note on Multistage Amplifiers?
- B Explain Miller's capacitance theorem.
- C Differentiate between voltage amplifier and power amplifier.
- D Draw and explain E-MOSFET as a differential amplifier.

Q2 10 marks each

- A Draw and explain a transformer coupled class A power amplifier with the help of neat diagram and waveforms and derive the expression of power efficiency.
- B Draw a small signal equivalent circuit of an E-MOSFET CS amplifier with voltage divider bias and R_s bypassed. Derive the expression for voltage gain, input resistance and output resistance.

Q3 10 marks each

- A Derive the equation of CMRR for the MOS differential pair amplifier.
- B Draw and explain high frequency model for BJT in CE configuration.

Q4 10 Marks each

- A Derive the expression for voltage gain, input impedance and output impedance for a CE amplifier with emitter bias and un-bypassed R_E .
- B Explain the operation of a MOS differential amplifier with common mode input signal

Q5 10 Marks each

- A Explain the operation of a MOS differential amplifier with differential mode input signal
- B Classify class A, class B and class AB power amplifiers

Q6
A

10 Marks each

Calculate low cutoff frequencies due to coupling and bypass capacitors of the circuit given in fig. 1

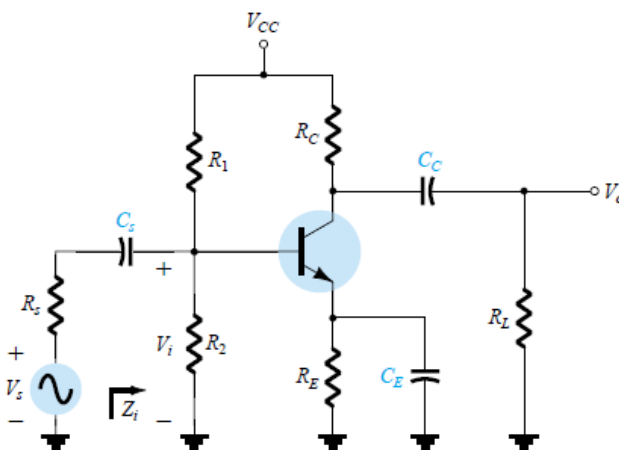


Fig. 1

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

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

$$R_L = 2.2 \text{ k}\Omega$$

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

B

Determine the input impedance, output impedance, voltage gain and current gain for the given circuit. Refer fig. 2

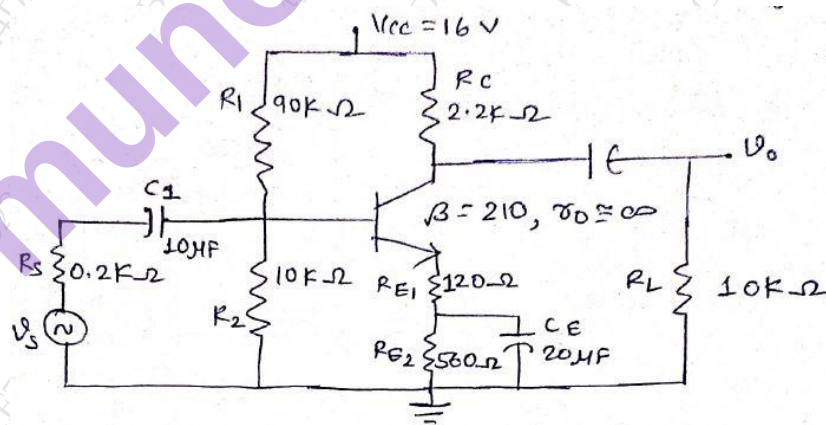


Fig. 2