Time: 3 hours Max. Marks:80

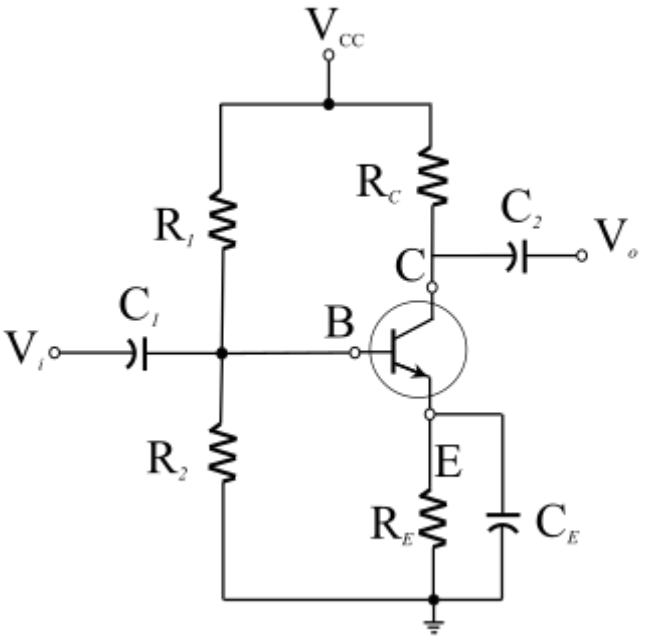
1. Question No.1 is compulsory.
2. Attempt any three from the rest.
3. Figure to the right indicates full marks.
4. Assume suitable data if it is necessary.

Q1) Answer any four of the following (entire syllabus)

a. Explain Diode as positive series clipper (05)
b. Explain BJT as a switch (05)
c. Draw and explain the characteristics of MOSFET (05)
d. Draw a block diagram of Op-Amp and explain the function of level shifter block (05)
e. What do you mean by line and load regulation in the case of a voltage regulator? (05)
f. Explain Zener diode (05)

Q2)

a. Analyse full wave bridge wave rectifier along with capacitor filter. Draw all the waveforms and diagrams required to justify your answer. (10)
b. In the following circuit of voltage divider bias calculate the Q point. (10)
Given Data: V_{CC}=22 V, R_1= 39KΩ, R_2=3.9KΩ, R_C=10KΩ, R_E=1.5KΩ, β=100



Q3)

a. For a given BJT CE amplifier (voltage divider bias), derive an expression for voltage gain, current gain, input impedance and output impedance using h-parameter (Small signal analysis) (10)

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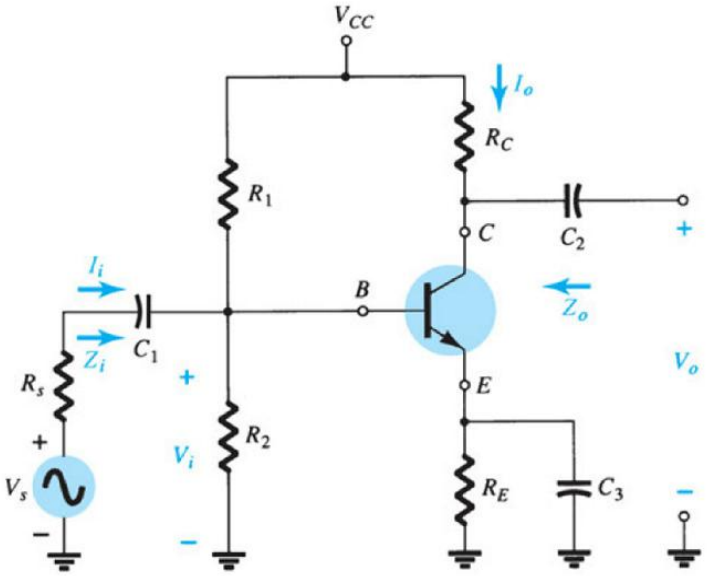

b. What are the different DC biasing techniques used for MOSFET? Analyse any one technique in detail. Derive all necessary expressions for the same. (10)

Q4)

a. Explain Op-Amp as an inverting amplifier and design an inverting amplifier for voltage gain Av= -12 (assume input resistance R_1=1KΩ) (10)

b. Write a short note on LED and Photodiode. Also, explain how this combination can be used in an optoisolator. (10)

Q5)

a. Explain Op-Amp as an Instrumentation amplifier (10)

b. Explain the Astable multivibrator using IC 555. Calculate the frequency of oscillation if R_A=R_B= 7.5kΩ and C=0.01μF (10)

Q6)

a. Derive expressions for voltage gain and output impedance of any one MOSFET CS amplifier circuit. (10)

b. Explain Op-Amp as a voltage-summing amplifier and derive an expression for voltage gain. (10)

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