SE SEM III Choice Based R-19 'C' Scheme JUNE 2025 12-6-2025

Time: 3 hours **Max. Marks: 80**

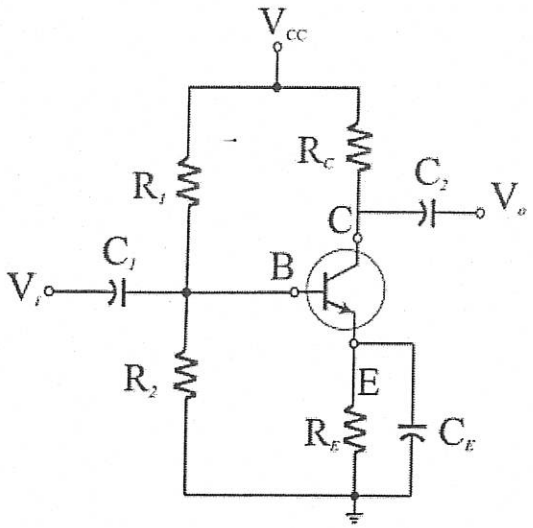
ELEC

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

a. Explain basic construction and operation of diode **(05)**
b. Explain BJT as an amplifier. **(05)**
c. Explain the operation of E-MOSFET. **(05)**
d. Explain the frequency response of an operational amplifier. **(05)**
e. Draw a functional block diagram of IC 555 **(05)**
f. Explain the operation of LED. **(05)**

Q2)

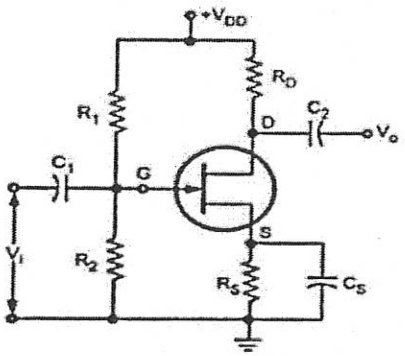
a. Analyse full-wave bridge wave rectifier along with 'LC' filter. Analyse the impact of 'LC' filer over the ripple factor. **(10)**
b. Calculate the Q point in the following circuit of BJT CE voltage divider bias.Given Data: V_{CC}=18 V, R_1= 50KΩ, R_2=10KΩ, R_C=3.3KΩ, R_E=1KΩ, β=100 **(10)**



Q3)

a. Perform small-signal analysis over a BJT CE amplifier with voltage divider bias using the h-model. Derive an expression for current gain, input impedance, voltage gain and output impedance. **(10)**

b. Find I_{DQ}, V_{GSQ}, V_D, and V_{DS} in the given circuit. Given Data:V_{DD}=18 V, R_1= 110MΩ, R_2=10MΩ, R_D=1.82KΩ, R_S=750Ω,I_{DSS}= 6 mA, V_P=$V_{GS(off)}$= -3V **(10)**



Q4)

a. Derive expressions for voltage gain and output impedance of MOSFET CS (Voltage divider bias) amplifier circuit. **(10)**

b. Explain Op-Amp as Schmitt trigger. **(10)**

Q5)

a. Explain Op-Amp as a zero crossing detector. **(10)**

b. Design a voltage regulator using IC LM 317 to produce an output voltage of 10 volts. **(10)**

Q6)

a. Write a short note on a Zener diode and an opto-isolator. **(10)**

b. Explain Op-Amp as a first-order low-pass filter. **(10)**
