

12/06/2025 SE ELECTRICAL SEM-III C-SCHEME AE AP CODE: 10082083

Time: 3 hours

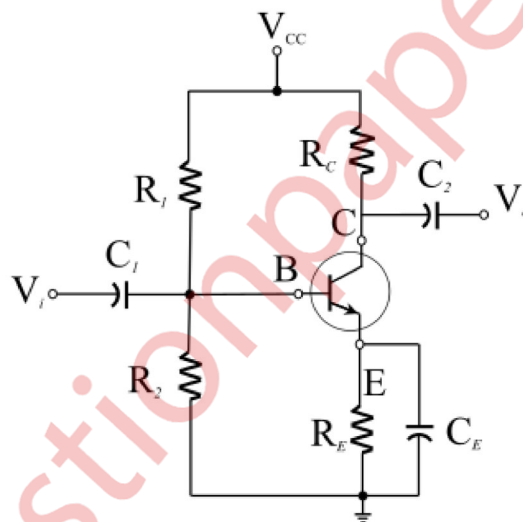
Max. Marks: 80

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

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

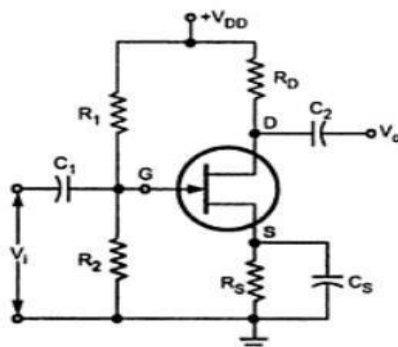
Q2)

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



Q3)

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