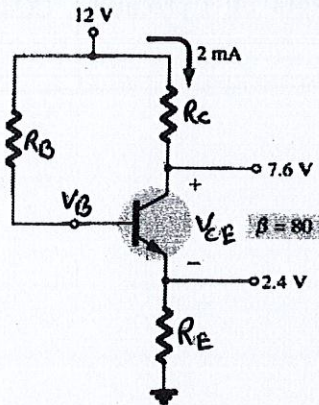


Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of a calculator is allowed

Q.No	Question	CO	Marks
Q1	Identify the biasing arrangement in the given circuit and find out the following using the given information- 1) R_B 2) R_C 3) R_E 4) V_{CE} 5) V_B  FIG. 4.123	CO1	5
Q2	a) What is the reactance of a $10\mu\text{F}$ capacitor at a frequency of 1kHz? For networks in which the resistor levels are typically in the kilohm range, is it a good assumption to use the short-circuit equivalence for the conditions just described? How about at 100kHz? b) Why does a BJT amplifier fail to amplify when the DC supply is zero? Explain the effect of insufficient DC biasing on the output waveform of a tabistor amplifier.	CO3	3+2

Q3	Draw the circuit diagram of an instrumentation amplifier, and what changes in the circuit diagram of the instrumentation amplifier are required, if we want to use it as an analog weight scale. Also, explain the working of an analog weight scale.	CO4	2+1+2
Q4	What is the difference between a basic comparator and a Schmitt trigger? For the inverting comparator, $V_{in} = 1\text{ V}$ (p-p) sine wave at 500Hz and supply voltages $= \pm 15\text{ V}$. Draw the output waveform if (a). $V_{ref} = 0.2\text{ V}$ (b). $V_{ref} = -0.2\text{ V}$ (c). $V_{ref} = 0\text{ V}$	CO4	2+1+1 +1
Q5	What is the Barkhausen Criterion for sustained oscillation? For a three-stage RC phase shift oscillator, derive the expression for the frequency of oscillation.	CO4	2+3
Q6	a) Determine the output voltage of an op-amp for input voltages of $V_{i1} = 200\text{ mV}$ and $V_{i2} = 140\text{ mV}$. The amplifier has a differential gain of $A_d = 6000$, and the value of CMRR is 10^5 b) Show the connection of an IC 741 op-amp as a three-stage amplifier with gains of +10, -18, and -27. Use a 270-k Ω feedback resistor for all three circuits. What output voltage will result for an input of 150 μV ?	CO4	3+4
Q7	Write a note on the offset currents and voltages of a practical Operational Amplifier.	CO4	3