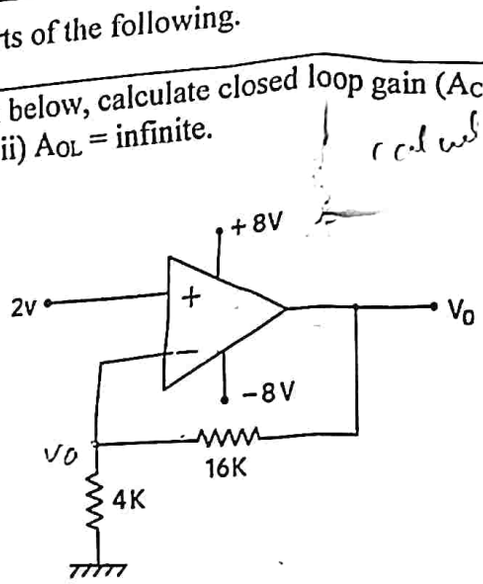
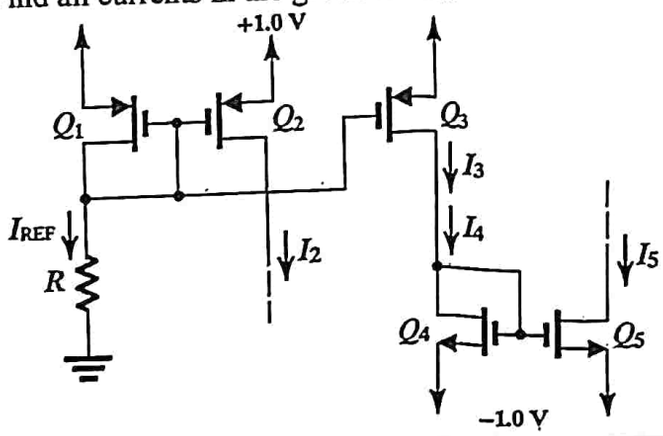
ub Code: BEC-262

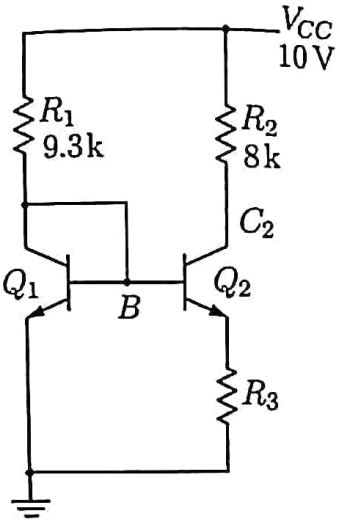
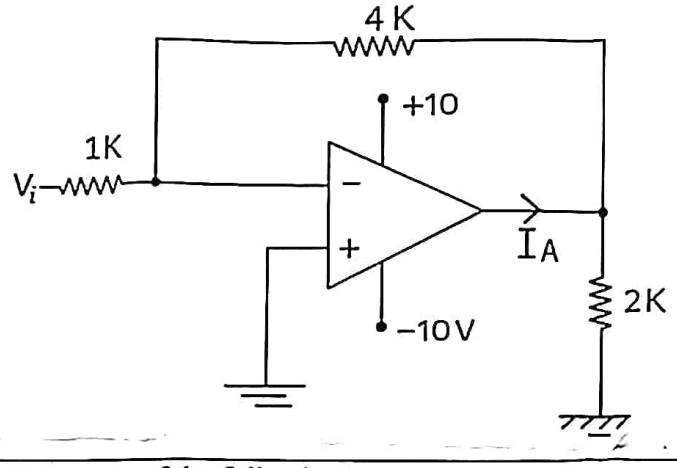
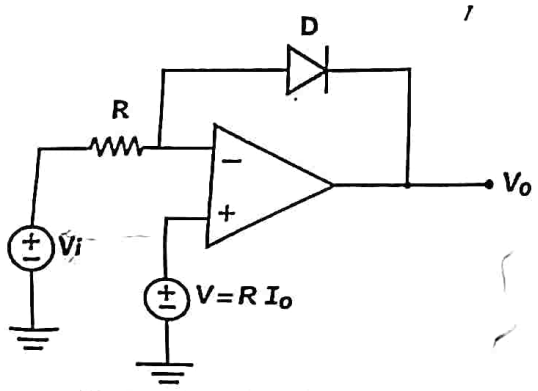
Roll No.

B. TECH. ECE
Year: II, Semester: IV
MINOR TEST (EXAMINATION): 2025-2026
Analog Integrated Circuits

Max Marks: 20

: 2 Hr.
: Answer all questions.

	Marks	CO	BL	PO	PI Code
Attempt any Two parts of the following.					
For the circuit shown below, calculate closed loop gain (A_{CL}) when i) open loop gain (A_{OL}) = 45, and ii) A_{OL} = infinite. 	4	CO1	3	1	1.3.1
Discuss the working principle of non-inverting Schmitt trigger circuit along with hysteresis curve. Find the expression for upper threshold voltage, lower threshold voltage, and hysteresis width.	4	CO2	2,3	1	1.2.1
What is the effect of transistor sizing in the current mirror circuits? For the current-mirroring circuit, the width-to-length ratio of transistor Q1 is $\left(\frac{W}{L}\right)$, width to length ratio of Q2, Q3, Q4, Q5 are $2\left(\frac{W}{L}\right), 3\left(\frac{W}{L}\right), 4\left(\frac{W}{L}\right), 2\left(\frac{W}{L}\right)$, respectively. Find all currents in the given circuit. 	4	CO1	2,3	1	1.3.1
Attempt any Two parts of the following					
Explain the need for base-current compensation in a bipolar current mirror. Discuss how base currents affect current accuracy and how compensation improves mirror performance.	3	CO1	2	1	1.2.1
Consider the current mirror circuit shown below (i) Find R3 in order to obtain I_{C_2} (collector current of Q_2 transistor) = 10 μA. (ii) For the above value of R3, what is V_{C_2} and V_{E_2} (collector and emitter voltage of Q_2 transistor)? Consider β is very large.	3	CO1	2,3	1	1.3.1

						
c)	Consider the circuit diagram given below, calculate current IA for the input voltage Vi = -2 volts. 	3	CO1	3	1	1.3.1
Q3.	Attempt any Two parts of the following					
a)	Discuss the working principle and expression for voltage multiplier circuit using OP-Amp.	3	CO2	2	1	1.2.1
b)	Consider the circuit shown below and the diode characteristics is given by $I = I_O(e^{V_D/V_T} - 1)$. At room temperature, if R=10 KΩ and I_O= 10 μA, find the input voltage (V_i) for which the output becomes zero volt. Consider thermal voltage as 25 mV. 	3	CO2	3,4	1	1.3.1
c)	Design and find the expression for ideal integrator circuit along with gain vs frequency plot. Find the output expression and plot the input and output waveforms for 5sin (ωt) as an input signal.	3	CO2	2,3	1	1.2.1

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)