

**ALL PRE-LAB ANSWERS MUST BE SUBMITTED THROUGH CANVAS BEFORE
SUNDAY, NOVEMBER 19, 11:59 PM**

CANDIDATES WITH NO SUBMISSION WILL NOT EARN ANY MARKS FOR LAB 4

Pre-Lab Assignment 4: Operational Amplifiers

This assignment contains two pages.

You may assume that the op amps are ideal in all cases.

Please note that only the numerical values to the answers for the following questions are required for submission on Canvas. Pay attention to the units specified by each question. There is no need to include the unit in your answer submitted on Canvas.

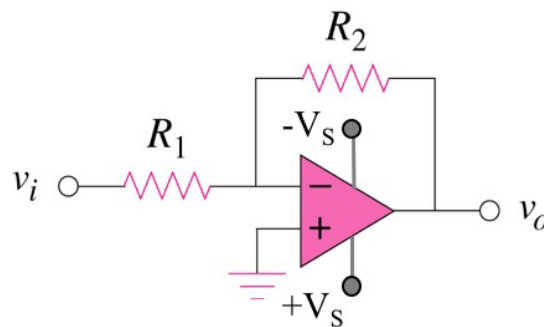


Fig 1: Circuit for questions 1 to 4

Referring to the circuit shown in Fig 1, where $V_S = 5\text{ V}$, $R_1 = 500\ \Omega$, $R_2 = 2\text{ k}\Omega$

1. Determine the closed-loop gain (v_o/v_i) of the circuit.
2. If $v_i = 0.3\text{ V}$, determine the voltage at the inverting input of the op amp **in V**.
3. Estimate the maximum possible value of v_o **in V**.
4. Determine the current supplied by the input source v_i **in mA**, if $v_i = 0.3\text{ V}$.

Remaining questions on the next page

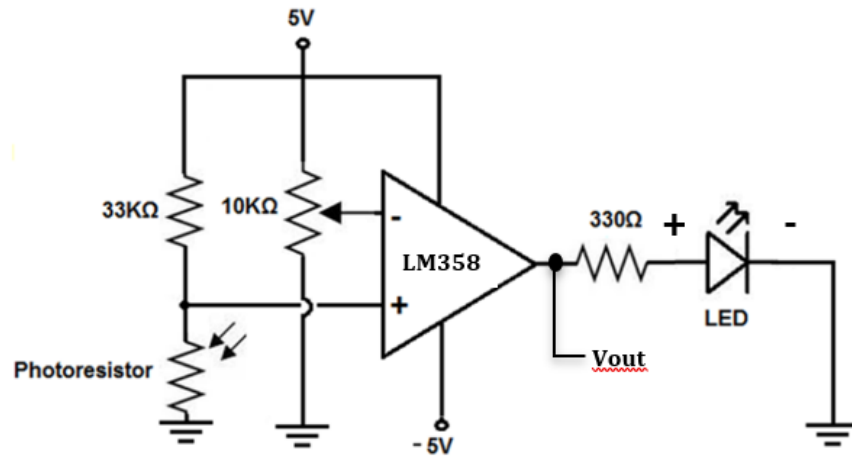


Fig 2: Circuit for questions 5 to 8

Referring to the circuit shown in Fig 2,

5. What type of op-amp circuit does the figure represent?
6. Which of the input terminal (V_- or V_+) is the V_{ref} ?
7. Determine the theoretical output voltage of the op-amp circuit (V_{out}), when $V_+ > V_-$.
8. Determine the theoretical output voltage of the op-amp circuit (V_{out}), when $V_+ < V_-$.