El-Manzala Higher Institute for Engineering and Technology		
First Semester :2023/2024	Code: : COM 121	
Course title: Electronic Engineering	Dr. Basma Yusef Eng. Madleen Mohamed	
Sheet (3)		

Question (1):

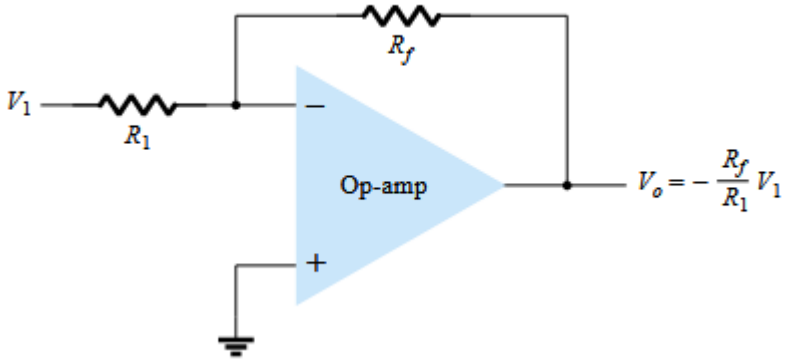
Determine the output voltage of an op-amp for input voltages of $V_{i_1} = 150\ \mu V$, $V_{i_2} = 140\ \mu V$. The amplifier has a differential gain of $A_d = 4000$ and the value of CMRR is:

(a) 100.

(b) 10^5.

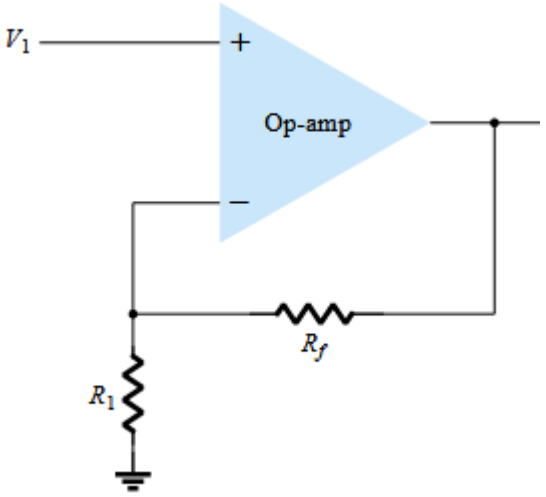
Question (2):

If the circuit of Fig. 14.15 has $R_1 = 100\ k\Omega$ and $R_f = 500\ k\Omega$, what output voltage results for an input of $V_1 = 2$ V?



Question (3):

Calculate the output voltage of a noninverting amplifier (as in Fig. 14.16) for values of $V_1 = 2$ V, $R_f = 500\ k\Omega$, and $R_1 = 100\ k\Omega$.

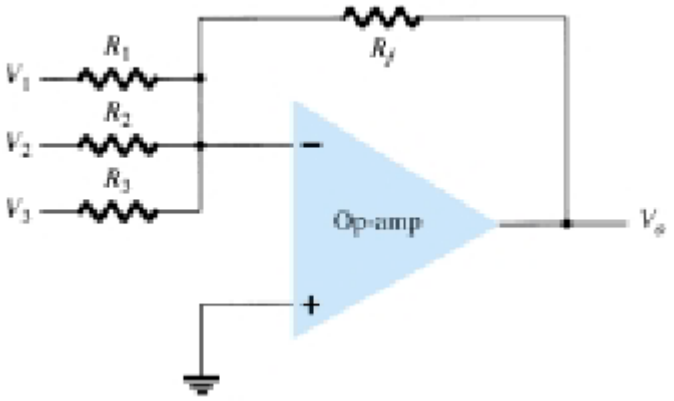


Question (4):

Calculate the output voltage of an op-amp summing amplifier for the following sets of voltages and resistors. Use $R_f = 1\ \text{M}\Omega$ in all cases.

(a) $V_1 = +1\ \text{V}$, $V_2 = +2\ \text{V}$, $V_3 = +3\ \text{V}$, $R_1 = 500\ \text{k}\Omega$, $R_2 = 1\ \text{M}\Omega$, $R_3 = 1\ \text{M}\Omega$.

(b) $V_1 = -2\ \text{V}$, $V_2 = +3\ \text{V}$, $V_3 = +1\ \text{V}$, $R_1 = 200\ \text{k}\Omega$, $R_2 = 500\ \text{k}\Omega$, $R_3 = 1\ \text{M}\Omega$.

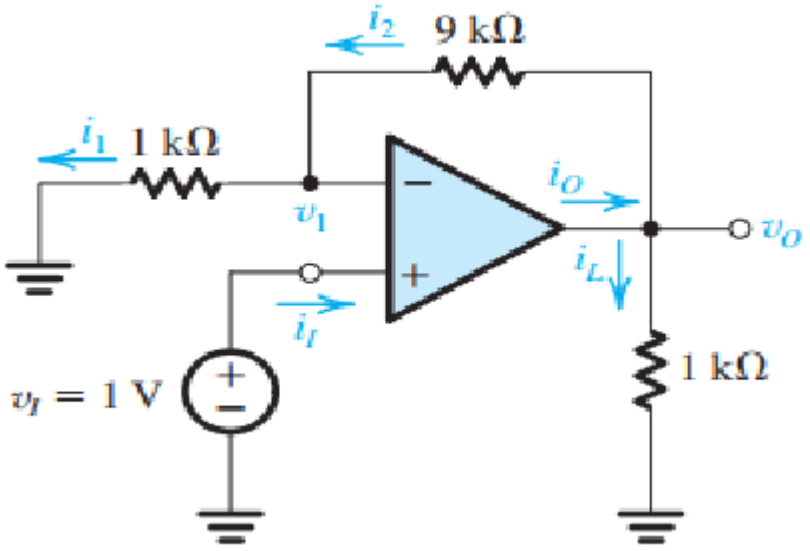


Question (5):

For the circuit shown in figure, find the values of

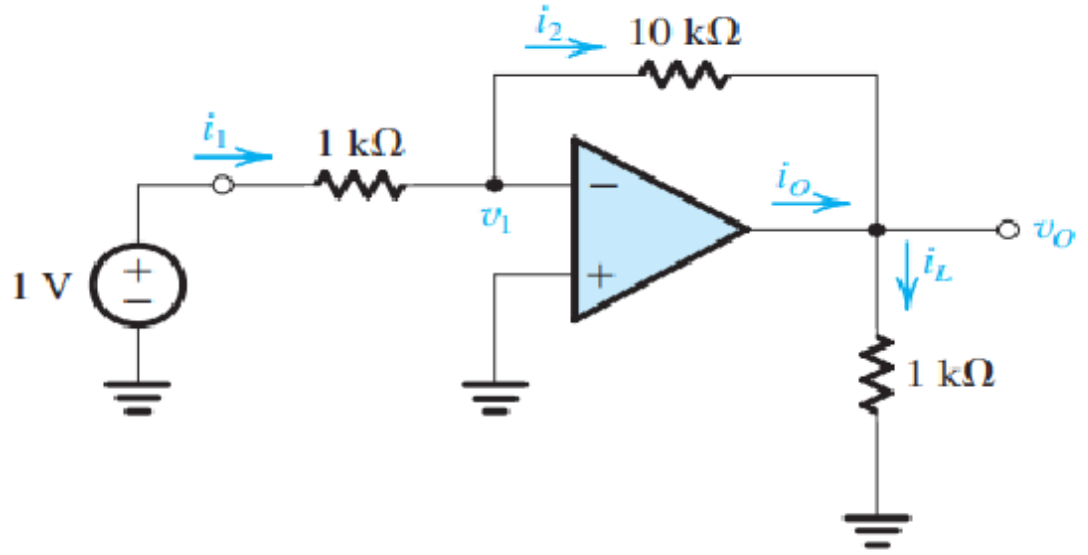
$i_I, v_1, i_1, i_2, V_o, i_L,$ ***and*** i_o.

• Also find the voltage gain Vo/V_i, the current gain I_L/ I_I



Question (6):

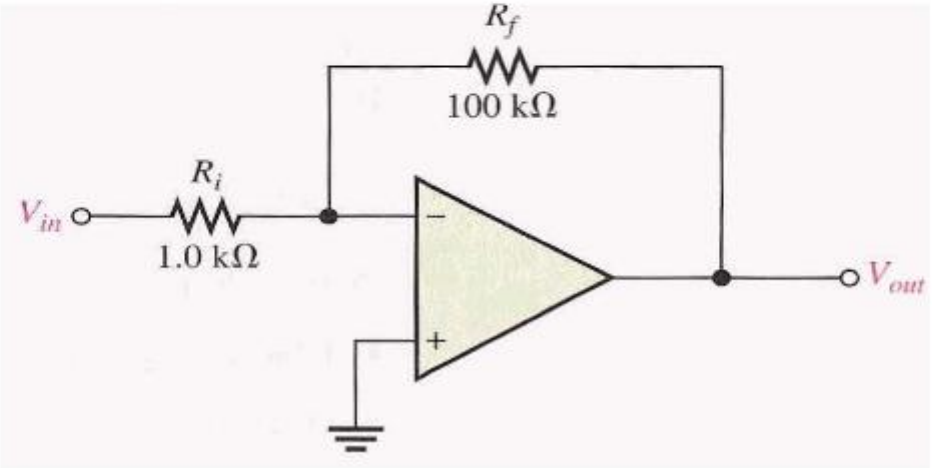
For the circuit in Figure determine the values of $v_1, i_1, i_2, vO, iL, and\ i_o$. Also determine the voltage gain v_o/v_I, current gain i_L/i_I, and power gain P_o/PI.



Question (7):

Find the values of the input and output impedances. Also, determine the closed-loop voltage gain.

($Z_{in} = 4\ \text{M}\Omega$, $Z_{out} = 50\ \Omega$, $A_{ol} = 50{,}000$).

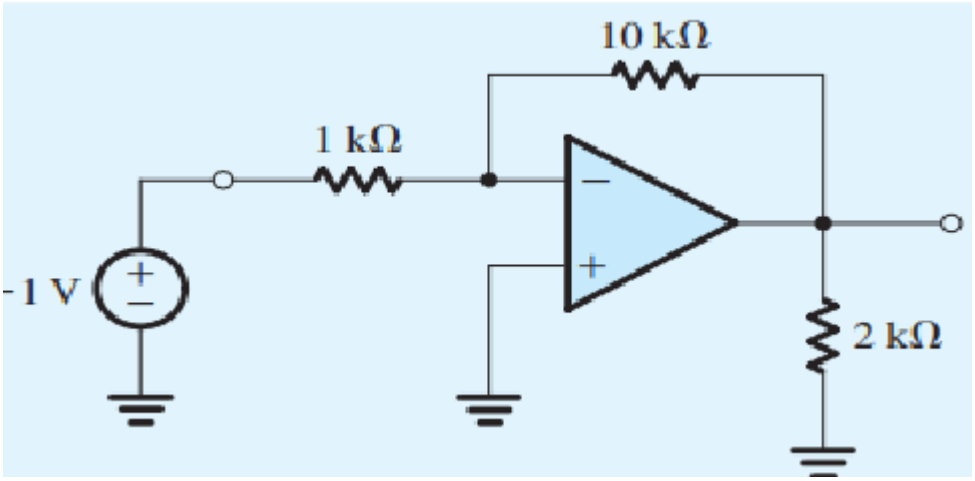


Question (8):

For the circuit in the figure:

(a) Determine the input and output impedances of the amplifier. The op-amp data sheet gives, Z_{out}= 75 Ω, and A_{ol} = 200,000.

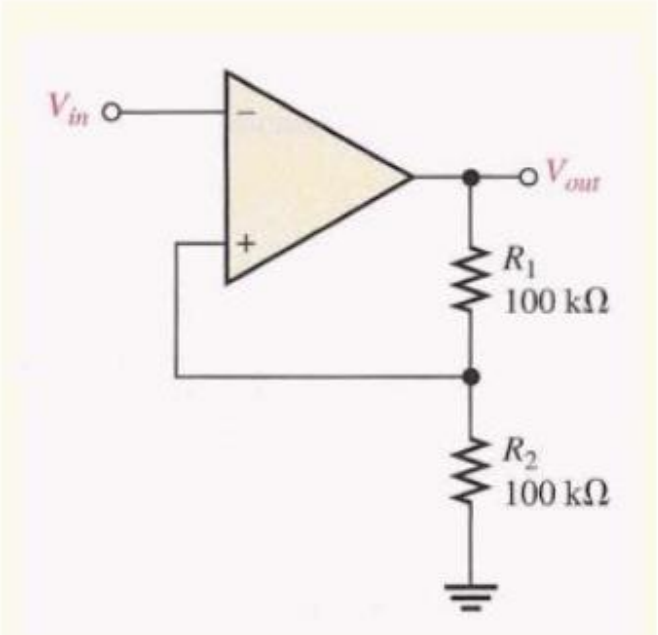
(b) Find the closed-loop voltage gain.



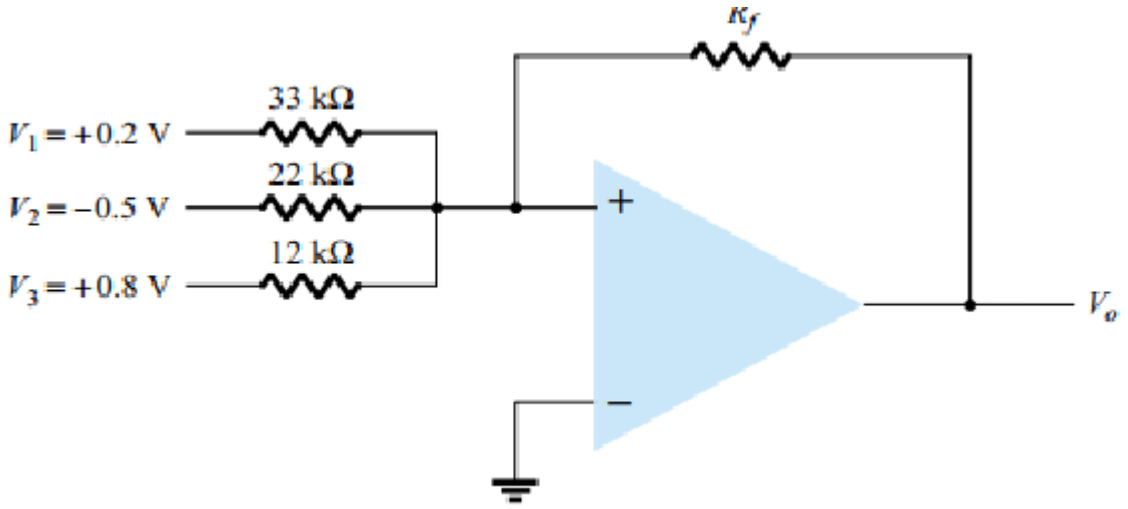
Question (9):

Determine the upper and lower trigger points for the comparator circuit in figure.

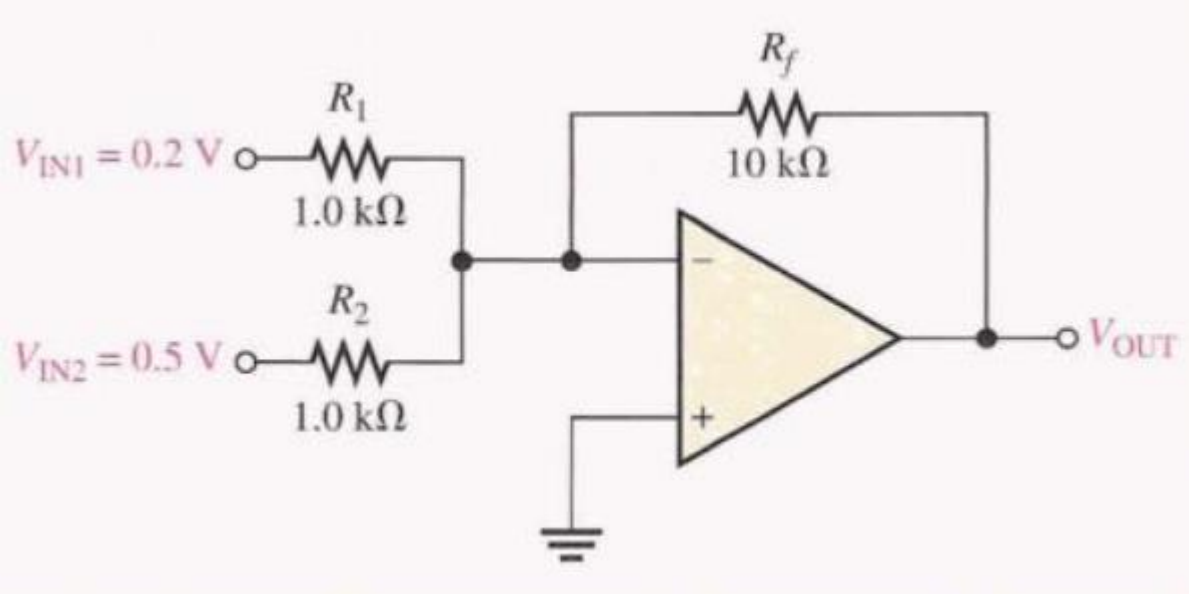
Assume that $+Vout(max) = +5\,V$ and $-Vout(min) = -5\,V$.



Question (10):
Calculate the output voltage developed by the circuit of Figure for Rf = 330 $k\Omega$

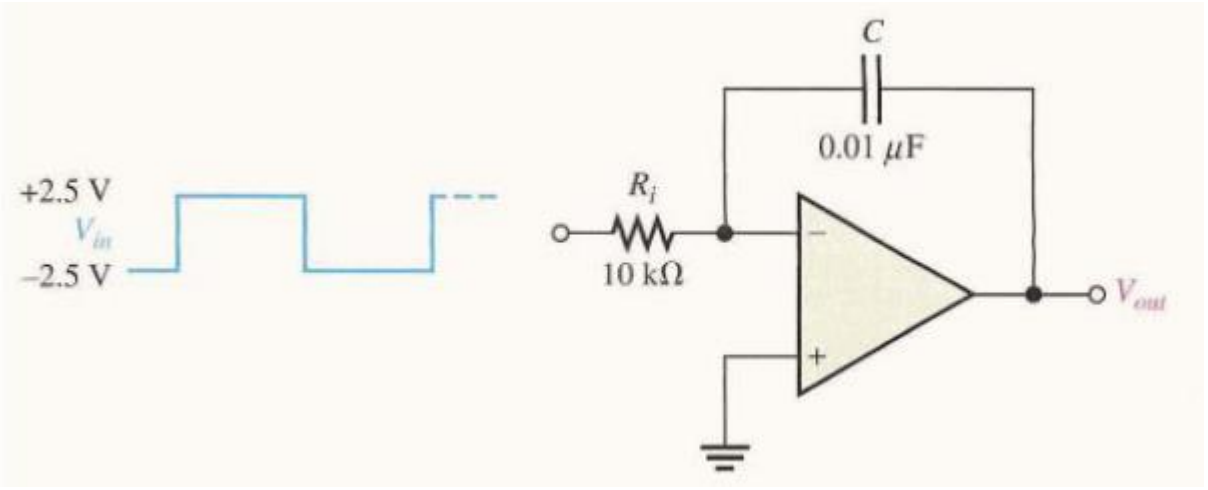


Question (11):
Determine the output voltage for the summing amplifier in figure

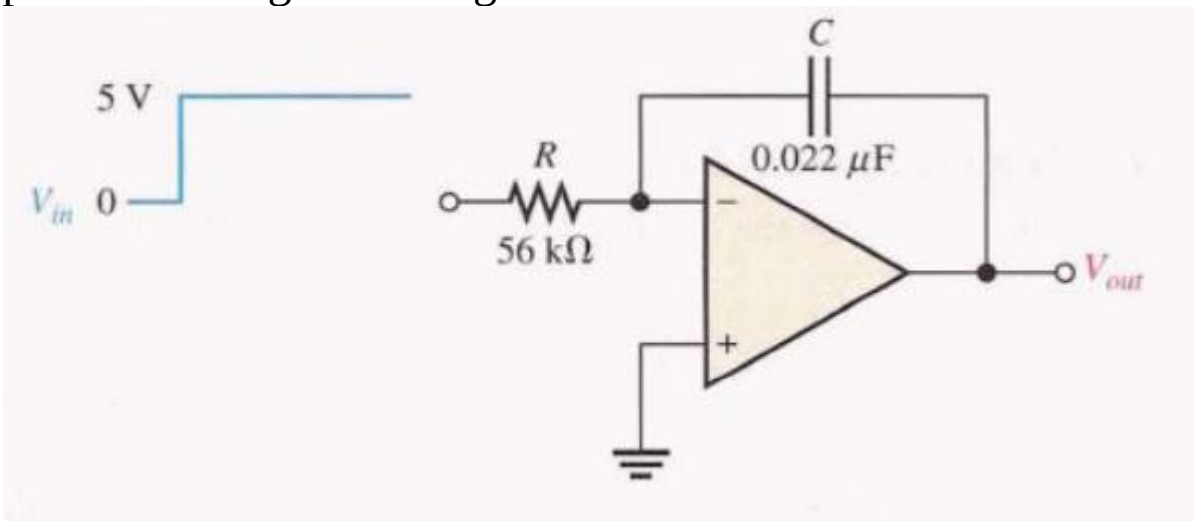


Question (12):

A) Determine the rate of change the output voltage in response to the input square wave, as shown for the integrator in figure. The output voltage is initially zero. The pulse width is 100μs.



b) Determine the rate of change of the output voltage in response to the step input to the integrator in figure



c) Determine the output voltage of the op-amp differentiator in figure for the triangular-wave input shown