

Assignment 02

Course: CSE 350

Summer 2025

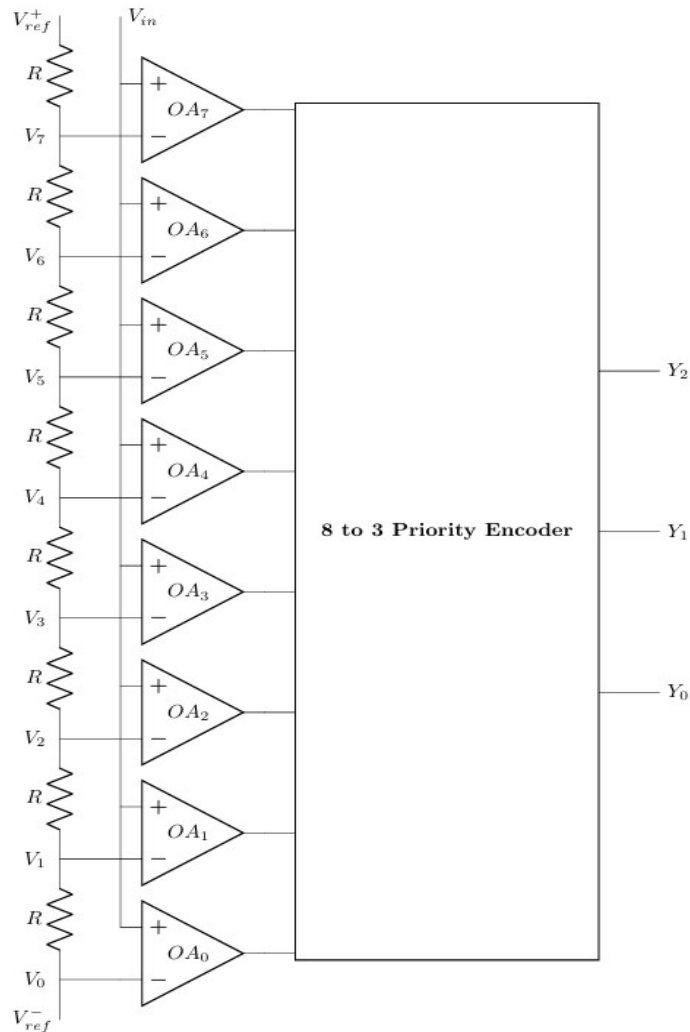
(Total Marks - 30)

Question – 01

CO3

10 marks

For the given *Flash ADC* circuit in Figure 2, $V_3 = 0$ V & $V_5 = 4$ V.

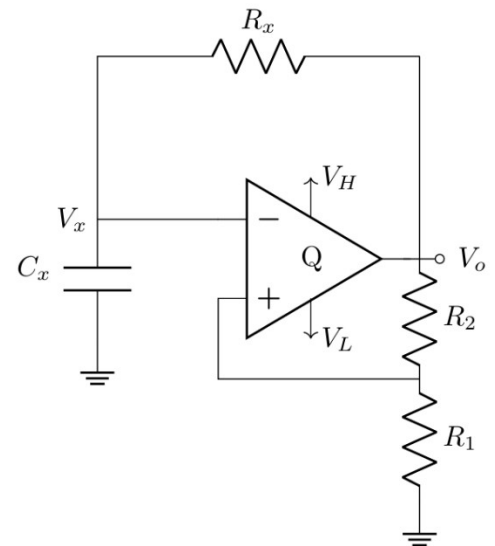


(a)	Find the <i>reference voltages</i> and draw the <i>digital output vs input</i> graph.
(b)	Now consider a <i>3-bit Binary Weighted DAC</i> with the same value of reference voltage as in (a). If its maximum output voltage matches the <i>highest quantization level</i> of the Flash ADC, and the feedback resistance, $R_f = 2$ k Ω , draw the DAC and find the <i>other resistances</i> .
(c)	Suppose, a <i>Dual Slope ADC</i> was used in (a) instead, with the <i>same</i> reference voltage. If the counter's output is <i>11010101</i> (in binary) and the clock speed is 1.5 MHz, what is the corresponding <i>input voltage</i> and <i>conversion time</i> ?

Question – 02**CO2****10 marks**

The following circuit generates a square wave with 200 Hz frequency and 50% duty cycle.

Here, $R_1 = R_2$, $V_H = +8\text{ V}$, $V_L = -8\text{ V}$.



(a)	If the capacitance value is $C_x = 100\text{ nF}$, find the value of R_x and the <i>time constant</i> (τ).
(b)	Draw the <i>input-output vs time waveform</i> on the same graph with proper labeling on the amplitude and time axis.

Question – 03**CO2****10 marks**

Suppose you want to design a triangular wave generator circuit. Required frequency of the wave is 1 kHz.

Duty cycle should be close to 50 %. You have +15V, -15 V power supply, $0.47\text{ }\mu\text{F}$ capacitor and different resistors.

(a)	Find the time period, rising time and falling time of the desired triangular wave.
(b)	Design a circuit to generate the required wave.
(c)	Suppose you have replaced the power supply of your designed circuit with +5V and -5V what will be new frequency and duty cycle of the triangular wave?