Assignment 01

Course: CSE 350

Summer 2025

(Total Marks - 30)

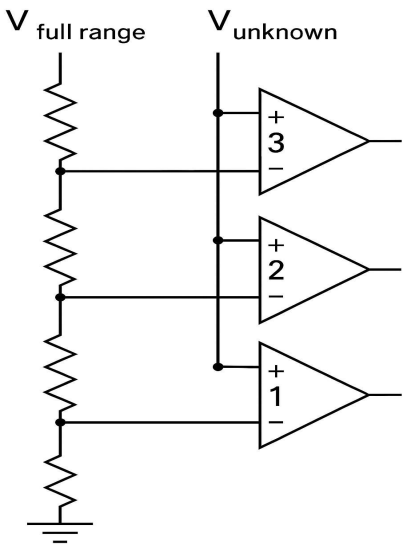
Question – 01 CO3 10 marks

R = 10kΩ, $V_{fullrange}$ = 10 V (Reference Voltage).

a. What will be the output binary bits line for the above circuit?

b. Draw the quantization level vs Input signal plot.

c. If **$V_{unknown}$ = 3.5 V**, what will be the quantization error for this case? (Hint: Quantization error = Actual value - Quantized value)



Question – 02 CO3 10 marks

$x(t) = 5 + 5 \sin(2\pi ft)$ V

Where f = 2 kHz.

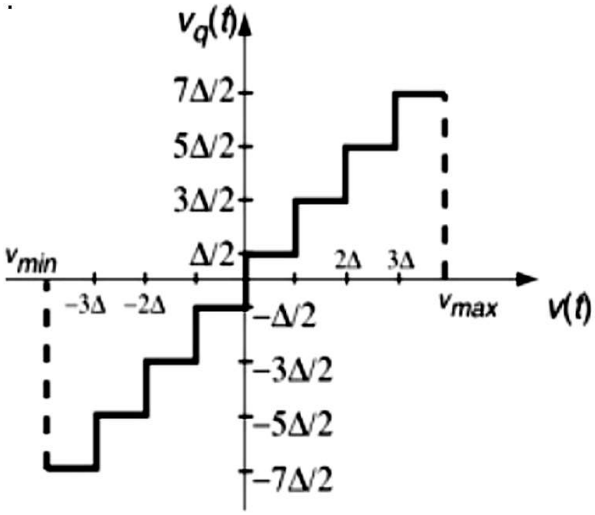
The above signal will be converted to a digital signal through an ADC circuit.

a. What will be the minimum required sampling frequency for this signal?

b. Suppose the sampling frequency is set at 10 kHz. Find the first 5 sampling values as well as their corresponding quantized value and encoded value.

Question – 03	CO3	10 marks

The following plot is the relationship between input and output of a midrise quantizer. Where the step size is 2V.



midrise quantizer

a. What is the number of binary bits required to express the quantization levels?

b. Find the corresponding quantized value if the inputs of the quantizer are-5.6 V and 7.34 V.

c. What will be the maximum value of the quantization error?

d. Design a full ADC circuit consisting of maximum current of the circuit should not exceed 0.1 mA.