# (6) ANALOG TO DIGITAL CONVERTER USING MULTISIM

## 1. OBJECTIVES

Design and implement a simple ADC circuit in Multisim.

## 2. QUANTIZATION AND COMPARISON

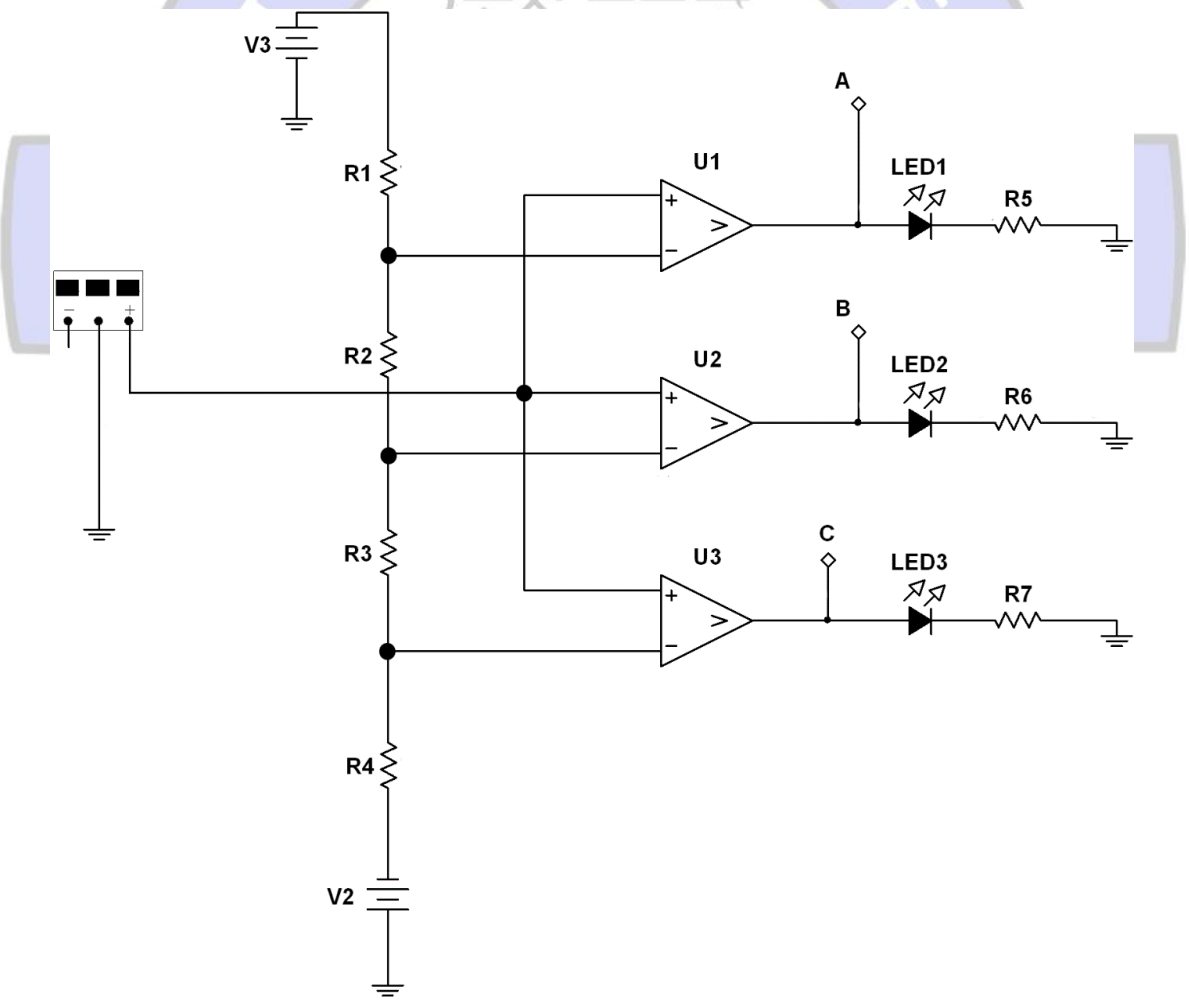
(1) Use a function generator to supply a triangular waveform with $V_P = 6\,\text{V}$ and a frequency of 10Hz.

(2) Use identical values for the resistors R1 through R4.

(3) Set the values of the voltage sources V2 and V3 to be the same as $V_P$ above.

(4) Use a combination of (an ideal comparator, a LED, and a resistor) in three groups.

(5) Study, run, and explain.

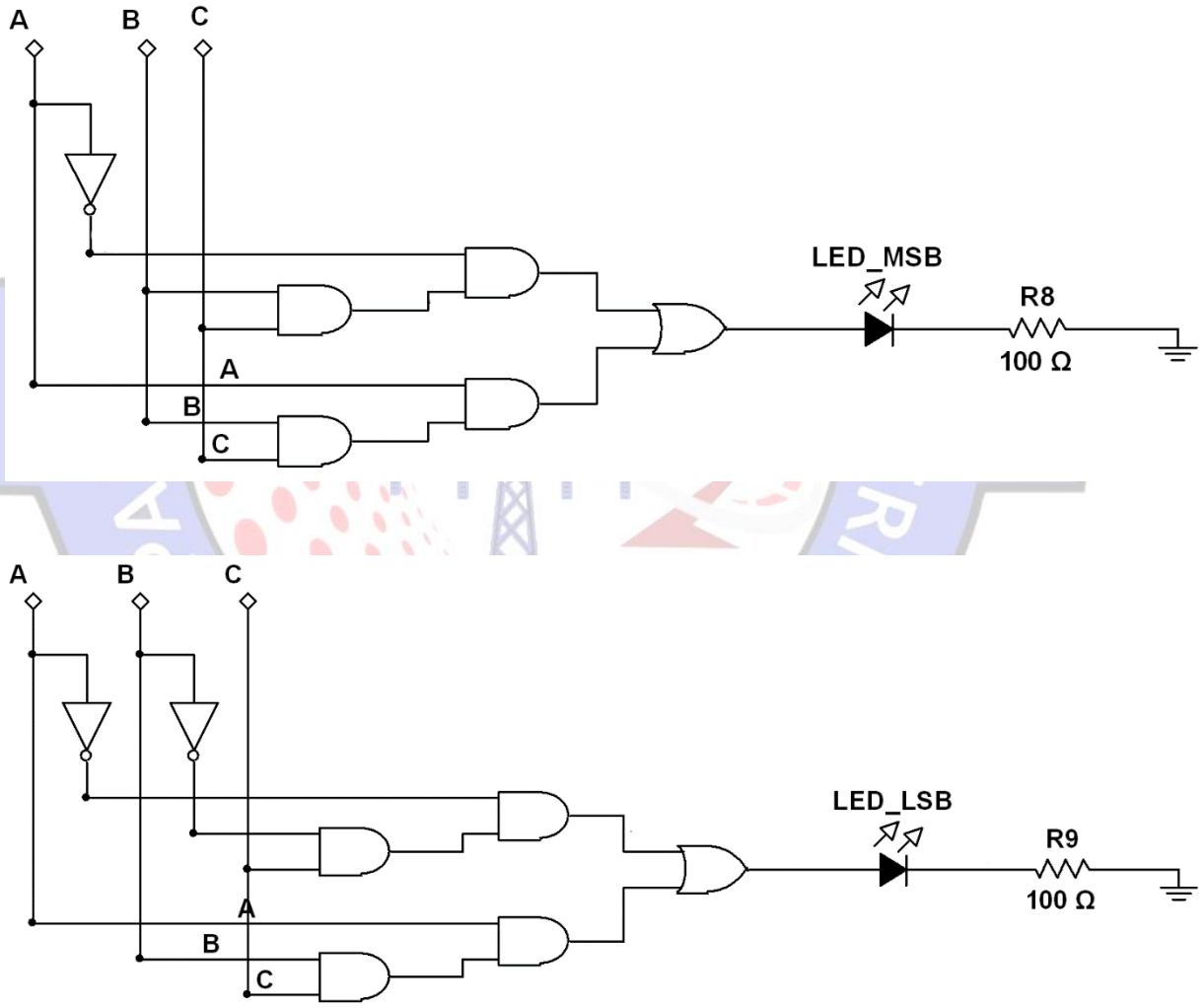


## 3. BINARY ENCODING

(1) From the above circuit, the indicated outputs A, B, and C can be mapped to the binary codeword as:

| A | B | C | MSB | LSB |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 |

(2) Simple logic circuits can be used to achieve this mapping. So, add the following logic circuits to the main electronic circuit above.




## 4. HOMEWORK

(1) Examine different frequencies and voltages at the input and the sampling.

(2) Simplify the logic circuits.