

# EC 205 Analog Electronics Lab

## Experiment No. 10

### Expt. 10: Study of Comparator and Schmitt Triggers

#### Aim:

To design and study a  $\mu A741$  based Comparator, Inverting Schmitt trigger and non-inverting Schmitt trigger circuits.

#### Circuit Diagrams:

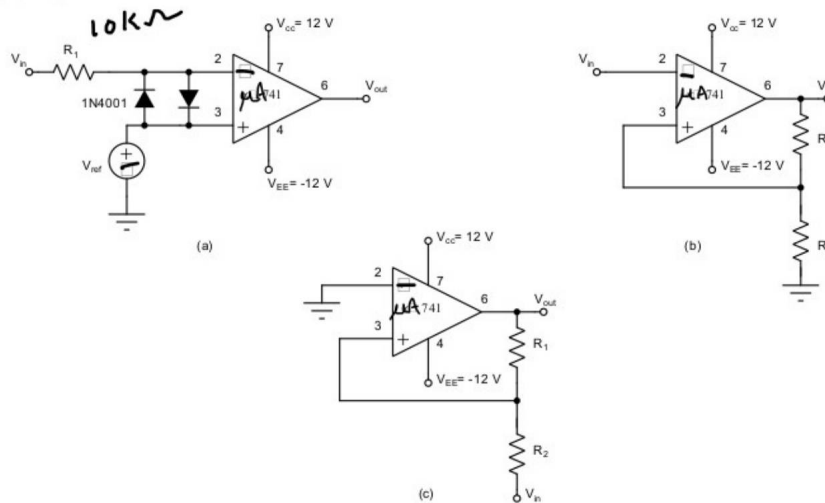


Figure 1: (a) Comparator (b) Inverting Schmitt trigger (c) Non-inverting Schmitt trigger

1. Test the comparator for  $V_{in} = 5 \sin(2007\text{rt})$  and  $V_{ref} = 0\text{ V}$ ,  $2\text{ V}$  and  $-3\text{ V}$ . (In hardware lab: Observe the transfer characteristic of the circuit by setting the DSO in X-Y mode.)
2. Design the inverting Schmitt trigger circuit for  $V_{LT} = -3\text{ V}$  and  $V_{JT} = 3\text{ V}$ . Assume the saturation voltage,  $V_{sat} = V_{CC} \sim 1\text{ V}$ . Observe the input and output waveforms. (In hardware lab: Observe the transfer characteristic of the circuit by setting the DSO in X-Y mode). What will be the output if the amplitude of input is set to  $2\text{ V}$ ?
3. Design the non-inverting Schmitt trigger circuit for  $V_{ET} = -4\text{ V}$  and  $V_{UT} = 4\text{ V}$ . Assume the saturation voltage,  $V_{sat} = V_{CC} \sim 1\text{ V}$ . Observe the input and output waveforms. (In hardware lab: Observe the transfer characteristic of the circuit by setting the DSO in X-Y mode.)

Think about these

- What happens if the input terminals of opamp in comparator circuit are interchanged?
- Can you design a Schmitt trigger circuit where  $|V_{JT}| \neq |V_{ET}|$ ? If yes, how? Design any one circuit.