

# ENEE2360 Project2

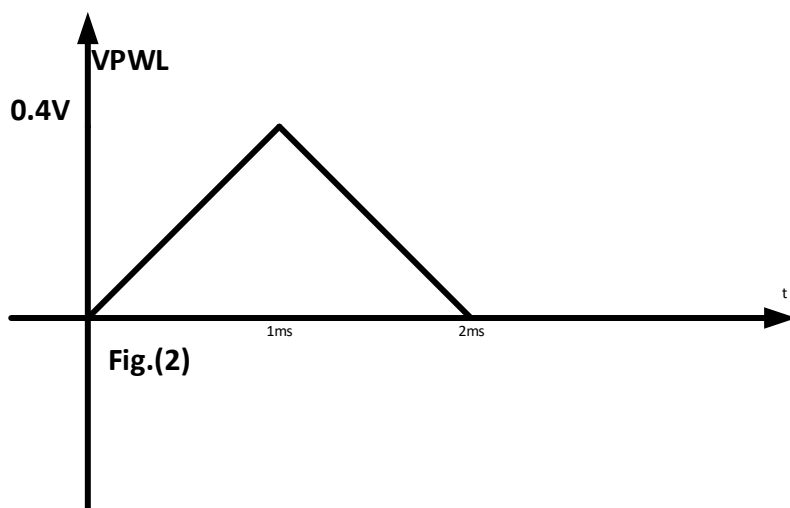
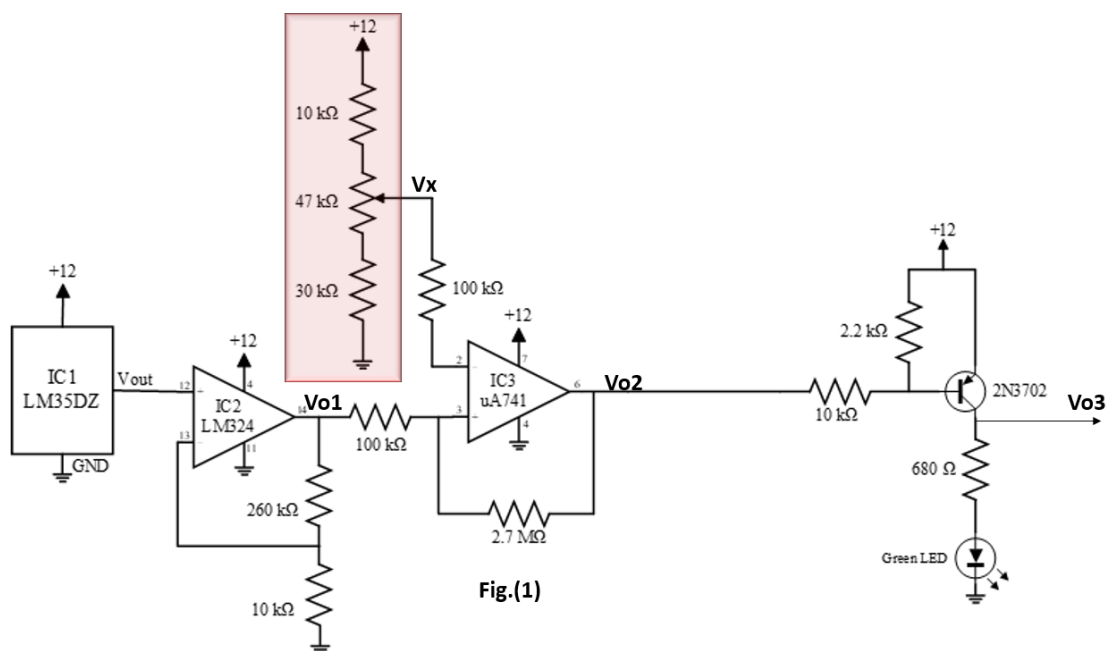
The room thermostat circuit shown in Fig.(1) is used to maintain the room temperature within predetermined temperatures  $T(\text{max})$  and  $T(\text{min})$

## Part1(Practical)

- a) Construct the circuit to verify its function.
- b) By changing the 47k pot, determine the value of  $V_x$  so that  $V_{o2} = +V_{sat}$  and the LED is off at room temperature.
- c) By changing the 47k pot, determine the value of  $V_x$  so that  $V_{o2} = -V_{sat}$  and the LED is on at room temperature.

## Part2 (Simulation and reporting)

- a) Replace the circuit to the left of  $V_x$  by a 6V battery.
- b) Replace the green LED with D1N4002
- b) Replacing the temperature sensor by a VPWL Voltage source as shown in Fig.(2) , plot  $V_{o1}$ ,  $V_{o2}(t)$ , and  $V_{o3}(t)$ .
- c) Estimate the upper threshold and the lower threshold temperatures from  $V_{o1}$  and  $V_{o2}(t)$  plots.
- d) Determine  $+V_{sat}$  and  $-V_{sat}$
- e) Using results of part d, calculate by hand the upper threshold and the lower threshold temperature.
- f) Write a simple report which includes:
  - 1 – Explanation of the function of the circuit of Fig.(1)
  - 2 - Simulation circuits and results
  - 3 - Comparison of simulation results to hand calculation
  - 4 – Conclusion



# GOOD LUCK