



EASTERN MEDITERRANEAN UNIVERSITY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC

ENGINEERING

EENG342 ELECTRONICS II

Spring 2020

EXPERIMENT 3

OP-Amp Comparator

Name	STD. No.

Group No.:

Date :

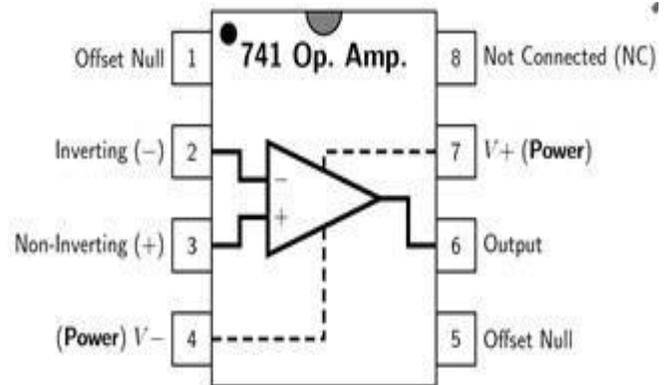
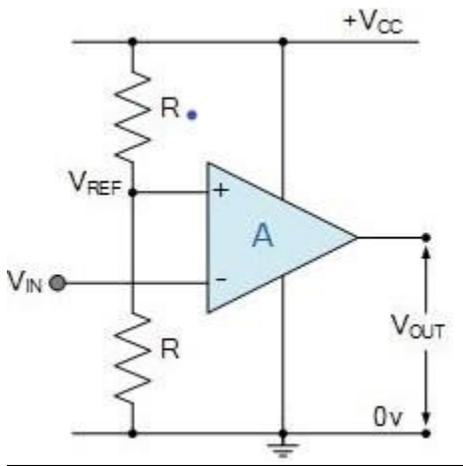
Objective: An understanding of the behavior of a comparator

A comparator is a circuit which compares a signal voltage applied at one input of an op-amp with a known reference voltage at the other input. It is basically an open loop op-amp with output $\pm V_{CC}$ as in the ideal transfer characteristics.

In non-inverting configuration, the reference voltage is connected to the inverting input of the operational amplifier with the input signal connected to the non-inverting input

In the inverting configuration, which is the opposite of the positive configuration above, the reference voltage is connected to the non-inverting input of the operational amplifier while the input signal is connected to the inverting input. Then when V_{IN} is less than V_{REF} the op-amp comparators output will saturate towards the positive supply rail, V_{CC} .

Part 1: inverting comparator



Step 1: Construct the circuit shown

Oscilloscope Settings:

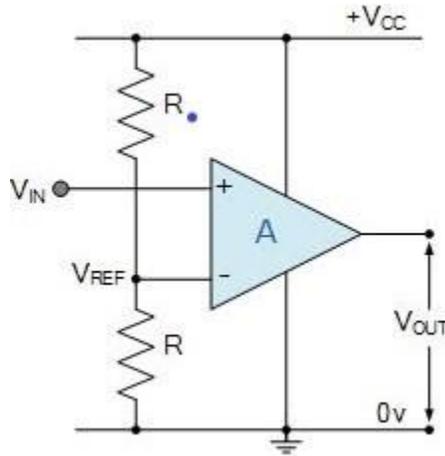
CH 1 (V_i)	: 2 VOLTS/DIV	AC Coupling
CH 2 (V_o)	: 5 VOLTS/DIV	DC Coupling
TIME	: 0.5 m SEC/DIV	
0- REFERENCE	: middle horizontal line	

Step 2: Apply 8 V_{p-p} sinewave (500 Hz) as an input signal. Adjust the potentiometer so that the DC voltage, V_R is 0V.

Step 3: Using the given oscilloscope settings sketch and label EXPERIMENTAL and THEORETICAL V_i and V_o for $V_R=0V$ and $V_R=5V$ to the provided graph paper.

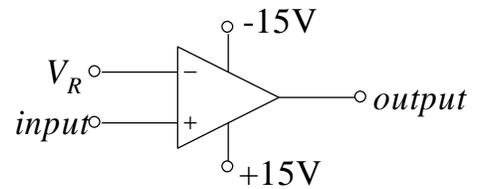
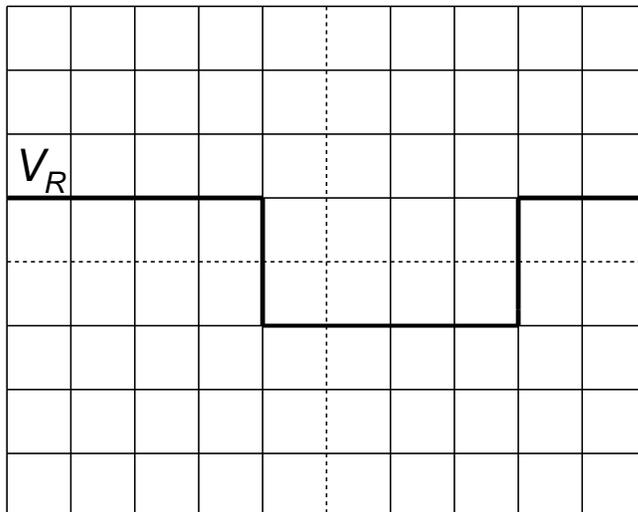
Part 2: Non-inverting comparator

Repeat Part 1 for the following non-inverting comparator circuit



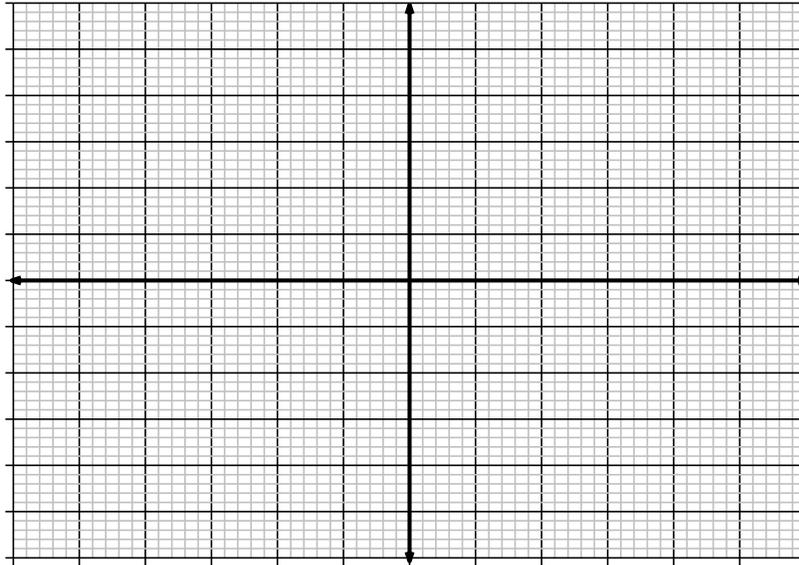
QUESTIONS:

Q1) Consider the given *ideal comparator*. The reference signal V_R is a 10 V_{p-p} square wave as shown. If the input signal is a 20 V_{p-p} triangle wave at 500 Hz, sketch the input and output signals.



VERTICAL AXIS: 5 VOLTS/DIV
HORIZONTAL AXIS: 0.25 m SEC/DIV

Part 1: Inverting comparator



Part 2: Non-inverting comparator

