

## Experiment Title 9

**STUDENT NAME: RAJDEEP JAISWAL**

**UID: 20BCS2761**

**SECTION: 20BCS26-B**

**SEMESTER: 02**

**DATE OF PERFORMANCE: MAY 7, 2021**

**SUBJECT NAME: BEEE**

**Aim: To measure gain of inverting operational amplifier.**

**Apparatus:**

S. No.	Apparatus Name	Rating	Quantity
1.	OPAMP IC	IC 741 OPAMP	1
2.	CRO	0-230V,30Hz	1
3.	CRO PROBES	.....	2
4.	DIGITAL MULTIMETER	.....	1
5.	FUNCTION GENERATOR	10Hz – 1MHz	1
6.	BREADBOARD	.....	1
7.	CONNECTING WIRES	As per requirement	

### ○ **THEORY:**

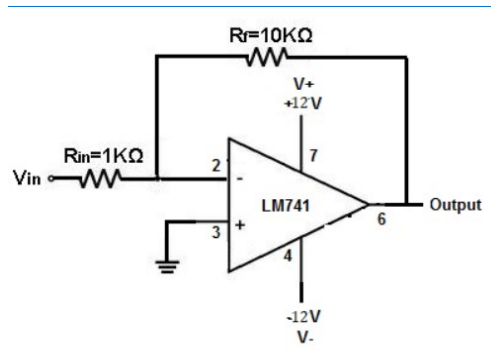
**Inverting Amplifier:** An amplifier whose O/P is out of phase with the input. It can amplify ac & dc signals. Its gain depends upon the values of feedback resistance (RF) & input resistance (R1). Figure 1 shows inverting amplifier.

$$V_O = -V_{IN} (R_F/R_{in})$$

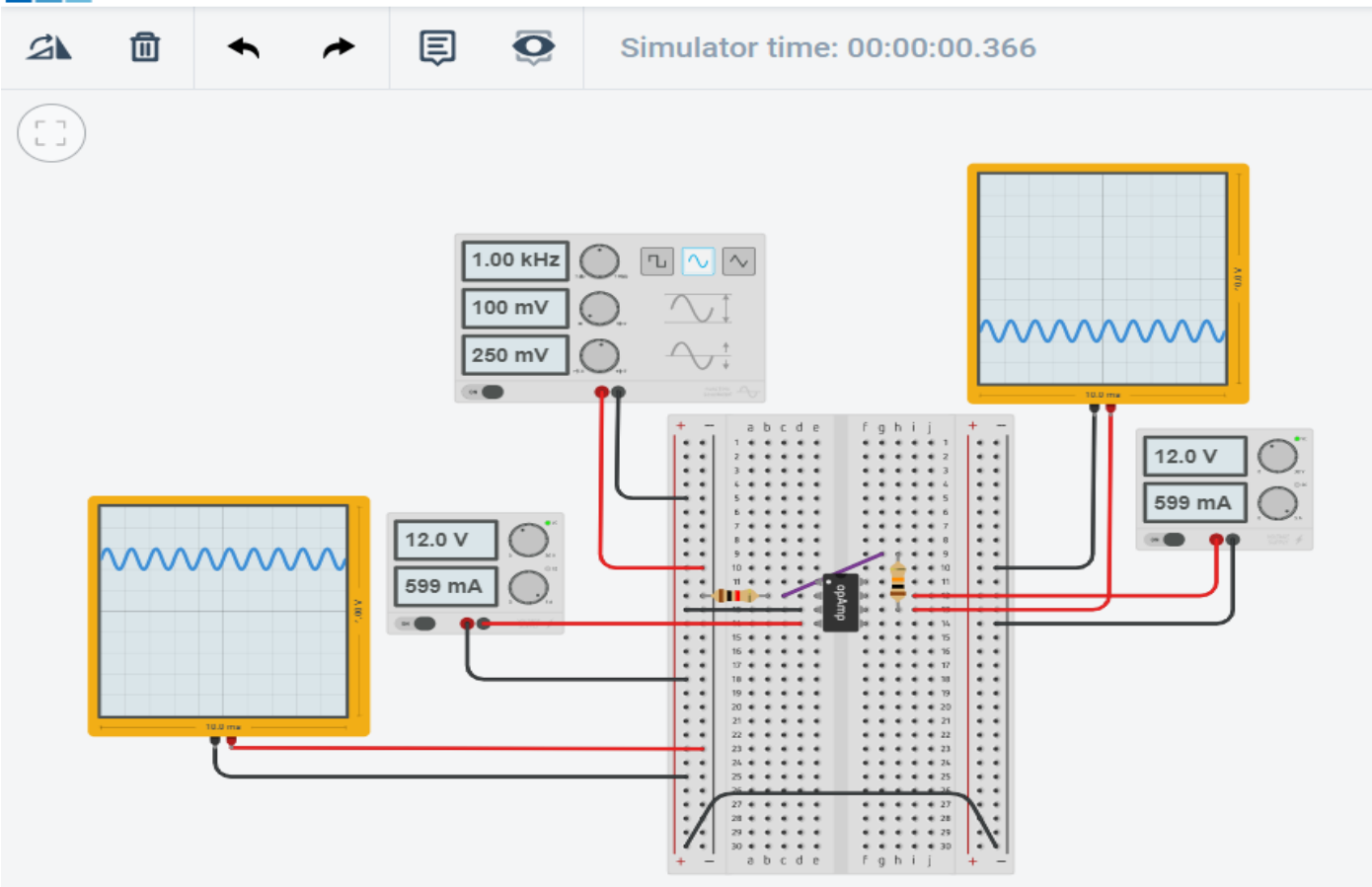
### ○ **Gain**

$$A = - (R_F/R_{in})$$

○ **Circuit :**



○ **Circuit Diagram:**



○ **Steps for experiment:**

1. Connect the circuit.
2. Connect supply voltage to I/P.
3. Note the values of  $R_F$  &  $R_1$ .
4. Note  $V_{IN}$  &  $V_{OUT}$  with the digital multimeter.
5. Repeat steps 2 & 3 for different values of  $R_F$  &  $R_1$ .

**OBSERVATION:**

S. No.	$R_F$	$R_{IN}$	$V_{IN}$	$V_o$	GAIN ( $V_o/V_{IN}$ )
1	10 KILO OHMS	1 KILO OHM	-12V	120V	-10

○ **Calculations/Theorems /Formulas used etc**

$$V_o = (-R_f/R_{in}) V_{in}$$

$$V_o = (-10/1) * (-12)$$

$$V_o = 120 \text{ V}$$

$$\text{GAIN (A)} = - (R_F/R_{in})$$

$$= -10/1$$

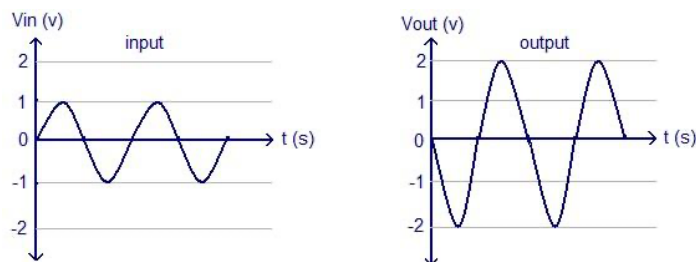
$$= -10$$

○ **Sources of error:**

- Due to internal resistance of multimeter.
- Due to interruption of power supply.
- Due to wrong connection of circuit.

- **Percentage error (if any or applicable):**
- **Result/Output/Writing Summary:**

**In inverting amplifier O/P is out of phase with I/P with I/P. The waveform for inverting and amplifier:**



- **Learning outcomes (What I have learnt):**

**From this experiment students will be able to understand the concept of inverting amplifier understand the construction and working of inverting amplifier learn gain of inverting amplifier**

### Evaluation Grid:

<b>Sr. No.</b>	<b>Parameters</b>	<b>Marks Obtained</b>	<b>Maximum Marks</b>
<b>1.</b>	Worksheet completion including writing learning objectives/Outcomes.(To be submitted at the end of the day).		<b>10</b>
<b>2.</b>	Post Lab Quiz Result.		<b>5</b>
<b>3.</b>	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.		<b>5</b>
	<b>Signature of Faculty (with Date):</b>	<b>Total Marks Obtained:</b>	