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| **Course Name:** | **Elements of Electrical and Electronics Engineering**  | **Semester:** | **I/II** |
| **Date of Performance:** |  **28/12/21** | **Batch No:** | **A2** |
| **Faculty Name:** | **Maruti Zalte** | **Roll No:** | **16010121045** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** |  **/ 25** |

**Experiment No: 10**

**Title:** **Inverting and Non-inverting amplifier using OPAMP**

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| **Aim and Objective of the Experiment:** |
| * To understand the open loop configuration of OPAMP
* To understand the concept of negative feedback and closed loop configuration of OPAMP.
* To understand inverting and Non-inverting amplifier of OPAMP
* To find gain of inverting and non-inverting amplifiers
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| **COs to be achieved:** |
| **CO5:** Understand operational amplifier and its applications |

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| **Circuit Diagram/ Block Diagram:** |
| **Pin diagram of IC 741**Pin Configuration of 741 Op-amp Diagram**1. Inverting Amplifier** **2. Non-inverting Amplifier** **Observation Table:****1. A. Inverting Amplifier: DC input Voltage**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr.No.** | **Vin (V)** | **Vout (V)** | **Practical****Gain = Vout/Vin** | **Theoretical****Gain=-RF/R1** |
| **1.** | **1** | **-9.99** | **-9.99** | **-10** |
| **2.** | **1.2** | **-12.0** | **-10** | **-10** |
| **3.** | **0.8** | **-7.99** | **-9.99** | **-10** |

**1. B. Inverting Amplifier: AC input Voltage**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sr.No.** | **Frequency (Hz)** | **Vin(p-p) (V)** | **Vout(p-p) (V)** | **Practical****Gain = Vout/Vin** | **Theoretical****Gain=-RF/R1** |
| **1.** | **1k** | **1** | **10** | **-10** | **-10** |
| **2.** | **2k** | **2** | **20** | **-10** | **-10** |
| **3.** | **1k** | **0.8** | **8** | **-10** | **-10** |

**2. A. Non-inverting Amplifier: DC input Voltage**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr.No.** | **Vin (V)** | **Vout (V)** | **Practical****Gain = Vout/Vin** | **Theoretical****Gain=1+RF/R1** |
| **1.** | **1** | **11** | **11** | **11** |
| **2.** | **1.2** | **13.2** | **11** | **11** |
| **3.** | **0.8** | **8.81** | **11** | **11** |

**2. B. Non-inverting Amplifier: AC input Voltage**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sr.No.** | **Frequency (Hz)** | **Vin(p-p) (V)** | **Vout(p-p) (V)** | **Practical****Gain = Vout/Vin** | **Theoretical****Gain=1+RF/R1** |
| **1.** | **1k** | **1** | **11** | **11** | **11** |
| **2.** | **2k** | **2** | **22** | **11** | **11** |
| 3. | 1k | 0.8 | 9 | 11.25 | 11 |

**Post Lab Subjective/Objective type Questions:****1. List the characteristics of Ideal operational amplifier**. 1. Infinite open loop gain
2. Infinite input impedance
3. Zero Output impedance
4. Infinite bandwidth
5. Zero Offset Voltage
6. Zero Input Bias current

**2. List the important parameters of IC 741 operational amplifier.** 1. The open loop gain is equal to 2x105
2. The input impedance is equal to 2 MOhm
3. Output impedance is from 75 - 100 Ohms
4. Finite Bandwidth around 1 MHz
5. The offset voltage is in the range of 2 - 6 mVolts
6. Input bias current is in the range of 500 nAmps

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| **Conclusion:** |
| Open loop, closed loop and the inverting & non-inverting configuration of Op-Amp has beensuccessfully completed. |

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| **Signature of faculty in-charge with Date:** |