| **3.Course Name:** | **Elements of Electrical and Electronics Engineering** | **Semester:** | **I/II** |
| --- | --- | --- | --- |
| **Date of Performance:** |  | **Batch No:** | **B2** |
| **Faculty Name:** |  | **Roll No:** | **16010121118** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** | **/ 25** |

**Experiment No: 10**

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

| **Aim and Objective of the Experiment:** |
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| * 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 |

| **COs to be achieved:** |
| --- |
| **CO5:** Understand operational amplifier and its applications |

| **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.** | **1.5** | **0.25** | **0.17** | **1/6** | | **2.** | **1** | **0.17** | **0.17** | **1/6** | | **3.** | **0.5** | **0.08** | **0.16** | **1/6** |   **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.** | **1000** | **1.5** | **0.25** | **0.17** | **1/6** | | **2.** | **1000** | **1** | **0.16** | **0.16** | **1/6** | | **3.** | **1000** | **0.5** | **0.09** | **0.17** | **1/6** |   **2. A. Non-inverting Amplifier: DC input Voltage**   | **Sr.No.** | **Vin (V)** | **Vout (V)** | **Practical**  **Gain = Vout/Vin** | **Theoretical**  **Gain=1+RF/R1** | | --- | --- | --- | --- | --- | | **1.** | **1.5** | **9.01** | **6.007** | **6** | | **2.** | **1** | **6.01** | **6.01** | **6** | | **3.** | **0.5** | **2.99** | **5.98** | **6** |   **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.** | **1000** | **1.5** | **9.01** | **6.07** | **6** | | **2.** | **1000** | **1** | **5.97** | **5.97** | **6** | | **3.** | **1000** | **0.5** | **2.98** | **5.95** | **6** |   **Screenshots:-**  **1.A:**      **1.B:**    **2.A:**    **2.B:**          **Post Lab Subjective/Objective type Questions:**  1. List the characteristics of Ideal operational amplifier.  An ideal op amp is usually considered to have the following characteristics:   * Infinite [open-loop gain](https://en.wikipedia.org/wiki/Open-loop_gain) G = *v*out / *v*in * Infinite [input impedance](https://en.wikipedia.org/wiki/Input_impedance) Rin, and so zero input current * Zero [input offset voltage](https://en.wikipedia.org/wiki/Input_offset_voltage) * Infinite output voltage range * Infinite [bandwidth](https://en.wikipedia.org/wiki/Bandwidth_(signal_processing)) with zero [phase shift](https://en.wikipedia.org/wiki/Phase_shift) and infinite [slew rate](https://en.wikipedia.org/wiki/Slew_rate) * Zero [output impedance](https://en.wikipedia.org/wiki/Output_impedance) Rout, and so infinite output current range * Zero [noise](https://en.wikipedia.org/wiki/Electronic_noise) * Infinite [common-mode rejection ratio](https://en.wikipedia.org/wiki/Common-mode_rejection_ratio) (CMRR) * Infinite [power supply rejection ratio](https://en.wikipedia.org/wiki/Power_supply_rejection_ratio).   2. List the important parameters of IC 741 operational amplifier.  We furnish the typical parameters of a **741 IC** in the table below.   | Parameters | Typical Range | Ideal Value | | --- | --- | --- | | Open Loop Gain(A) | 105 to 108 | ∝ | | Input Resistance(Ri) | 105 to 1013 | ∝ | | Output Resistance(Ro) | 10 to 100 | 0 | |

| **Conclusion:** |
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| We learnt about the features of IC 741. |

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