| Course Name: | **Elements of Electrical and Electronics Engineering** | **Semester:** | **I/II** |
| --- | --- | --- | --- |
| **Date of Performance:** |  | **Batch No:** | **G3** |
| **Faculty Name:** | **Milind Marathe** | **Roll No:** | **16010421063** |
| **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:** |
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| **CO5:** Understand operational amplifier and its applications |

| **Circuit Diagram/ Block Diagram:** |
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| **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.** | **0.9** | **-4.49294** | **-4.99215555556** | **5** | | **2.** | **0.65** | **-3.24302** | **-4.98926153846** | **5** | | **3.** | **3.1** | **-10.4979** | **-3.38641935484** | **5** | | **4.** | **-2.1** | **10.5061** | **-5.0029047619** | **5** |   **In observation 3 the output will never cross 11 because of saturation as the value of VCC and VEE is 12.**  **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** | **3** | **15** | **5** | **5** | | **2.** | **1K** | **4** | **20** | **5** | **5** | | **3.** | **1K** | **5** | **22** | **4.4** | **5** | | **4.** | **1K** | **2** | **10** | **5** | **5** |   **In observation 3 the output will never cross 22 because of saturation as the value of VCC and VEE is 12.**  **2. A. Non-inverting Amplifier: DC input Voltage**   | **Sr.No.** | **Vin (V)** | **Vout (V)** | **Practical**  **Gain = Vout/Vin** | **Theoretical**  **Gain=1+RF/R1** | | --- | --- | --- | --- | --- | | **1.** | **2** | **10.9978** | **5.4989** | **6** | | **2.** | **1** | **6.00619** | **6.00619** | **6** | | **3.** | **1.5** | **9.00591** | **6.00394** | **6** | | **4.** | **-1.2** | **-7.19254** | **5.99378333333** | **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.** | **1K** | **1** | **6** | **6** | **6** | | **2.** | **1K** | **1.5** | **9** | **6** | **6** | | 3. | 1K | 4 | 22 | 5.5 | 6 |   **Screenshots**   1. **Inverting AC amplifier**    1. **Saturation**      * 1. **Unsaturated**      1. **Inverting Amplifier DC**    1. **Unsaturated**      * 1. **Saturated**      1. **Non Inverting DC Amplifier**    1. **Saturated**      * 1. **Unsaturated**      1. **Non Inverting AC Amplifier**    1. **Unsaturated**      * 1. **Saturated**     **Theoretical calculation-**  **Non-Inverting-**    **Inverting**    **Post Lab Subjective/Objective type Questions:**  1**. List the characteristics of an Ideal operational amplifier.**  Ans-   1. Infinite input impedance 2. Zero output impedance 3. Zero common-mode gain, or, infinite common-mode rejection 4. Infinite open-loop gain A 5. Infinite bandwidth   2. **List the important parameters of the IC 741 operational amplifier.**  Ans- Important Parameters are-   1. Open Loop Gain-105 to 108 2. Input Resistance- 105 to 1013 3. Output Resistance- 10 to 100 |
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| **Conclusion:** |
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| We successfully understood the inverted as well as non inverted amplification IC 741 |

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