

Basic Electronics Circuit's Lab

Experiment no. 3

1. DC Regulated power supply.

1) Rectifiers A) Half Wave Rectifier

Connect the circuit as shown in Fig 1.1. Using a CRO, measure the maximum voltage V_m at the output of the rectifier. Using a DC voltmeter, measure the DC voltage V_{dc} at the load resistance $1K\Omega$. Plot the graph for CRO output.

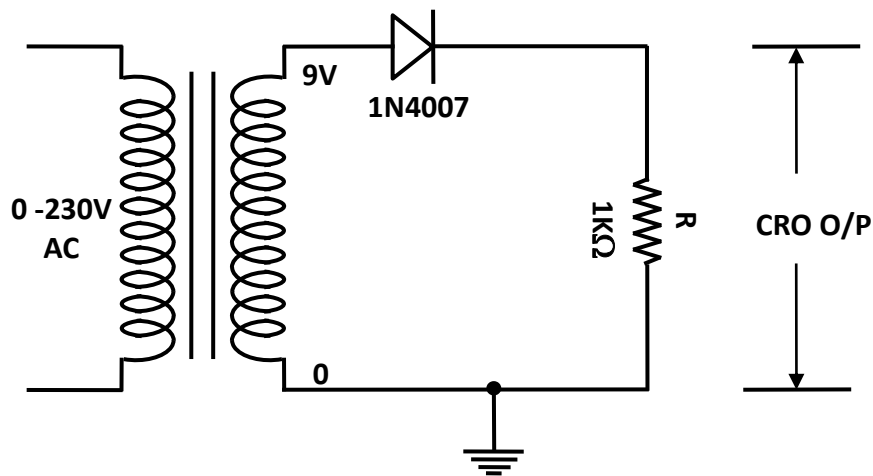


Fig 1.1

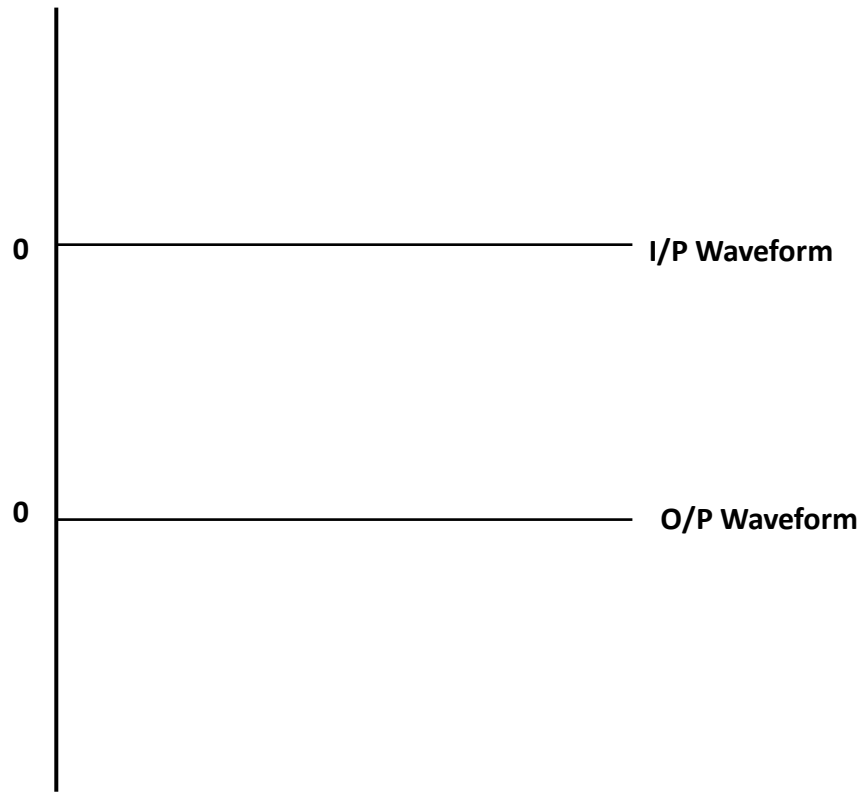
$$\text{RMS value of voltage } V_{rms} = \frac{V_m}{2} = \dots\dots\dots$$

$$\text{Average value of voltage } V_{dc} = \frac{V_m}{\pi} = \dots\dots\dots$$

$$\text{Ripple factor} = \sqrt{\left(\frac{V_{rms}}{V_{dc}}\right)^2 - 1} = \dots\dots\dots$$

$$\text{Rectifier Efficiency} = \frac{P_{dc}}{P_{ac}} = \dots\dots\dots$$

$$\text{Where } P_{ac} = \frac{V_{rms}^2}{R} \quad \text{and} \quad P_{dc} = \frac{V_{dc}^2}{R}$$



B) Full Wave Rectifier

Connect the circuit as shown in **Fig 2.1**. Using a CRO, measure the maximum voltage **V_m** at the output of the rectifier. Using a DC voltmeter, measure the DC voltage **V_{dc}** at the load resistance **$1K\Omega$** . Plot the graph for CRO output.

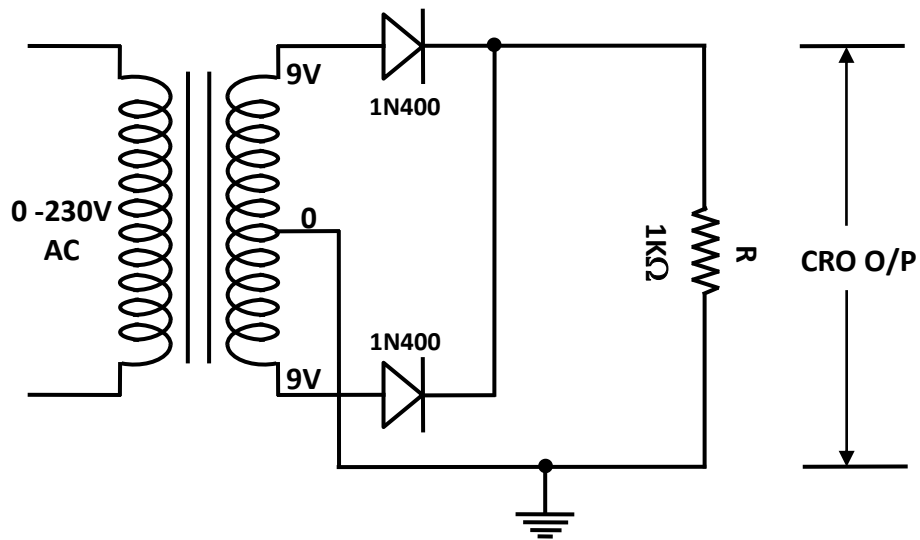


Fig 2.1

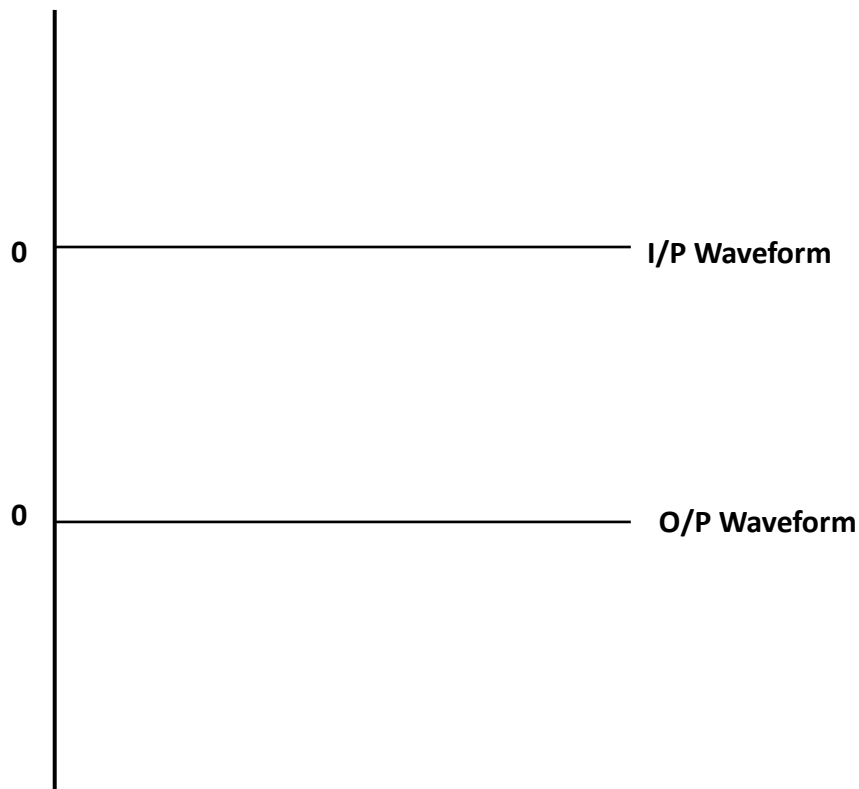
RMS value of voltage $V_{rms} = \frac{V_m}{\sqrt{2}} = \text{-----}$

Average value of voltage $V_{dc} = \frac{2V_m}{\pi} = \text{-----}$

Ripple factor $= \sqrt{\left(\frac{V_{rms}}{V_{dc}}\right)^2 - 1} = \text{-----}$

Rectifier Efficiency $= \frac{P_{dc}}{P_{ac}} = \text{-----}$

Where $P_{ac} = \frac{V_{rms}^2}{R}$ and $P_{dc} = \frac{V_{dc}^2}{R}$



B) Full Wave Bridge Rectifier

Connect the circuit as shown in **Fig 3.1**. Using a CRO, measure the maximum voltage **V_m** at the output of the rectifier. Using a DC voltmeter, measure the DC voltage **V_{dc}** at the load resistance **1kΩ**. Plot the graph for CRO output.

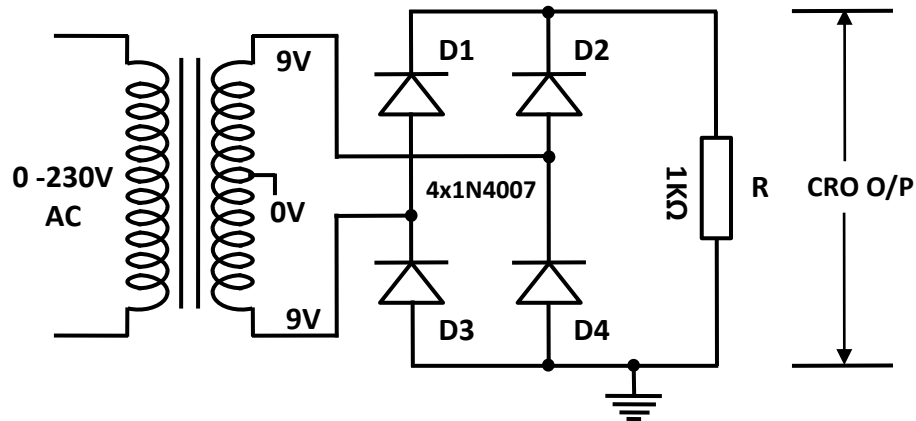


Fig 3.1

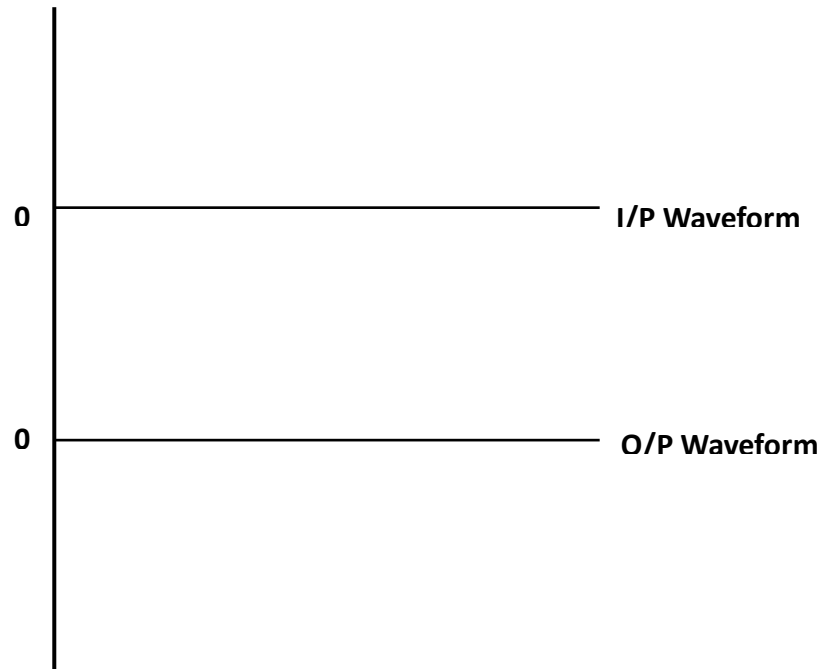
$$\text{RMS value of voltage } V_{rms} = \frac{V_m}{\sqrt{2}} = \text{-----}$$

$$\text{Average value of voltage } V_{dc} = \frac{2V_m}{\pi} = \text{-----}$$

$$\text{Ripple factor} = \sqrt{\left(\frac{V_{rms}}{V_{dc}}\right)^2 - 1} = \text{-----}$$

$$\text{Rectifier Efficiency} = \frac{P_{dc}}{P_{ac}} = \text{-----}$$

$$\text{Where } P_{ac} = \frac{V_{rms}^2}{R} \quad \text{and} \quad P_{dc} = \frac{V_{dc}^2}{R}$$



DC Regulated power supply:

The complete circuit diagram of the d-c power supply is given in **Fig. 4.1**. In this experiment, we will study the performance of a d-c power supply, which consists of a transformer with a center- tapped secondary, two rectifier diodes (1N4007), a shunt capacitor filter and a voltage regulator (IC 7805). . Using a CRO and DC voltmeter, measure the voltage **at** TP1, the output of the rectifier, measure the regulated voltage at TP2. Plot the graph .

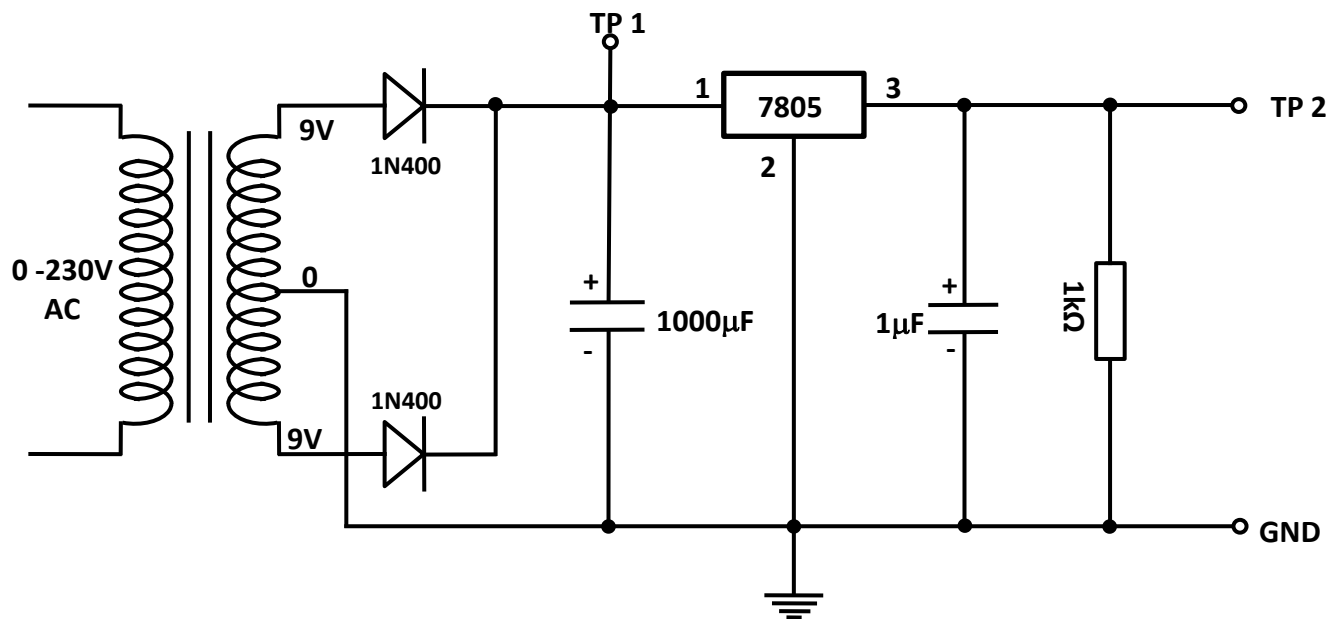
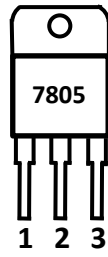


Fig 4.1

- 1 – Input
- 2 – Gnd
- 3 – Output



Front view of 7805

