# PROJECT   REPORT

Electronic Devices and Circuits

Muhammad Umar Farooq

Abstract:

The project "Variable DC Power Supply" plays a very important role in the laboratory functions and that is mainly to the electronics labs. As in electronics all the instruments, components work on a particular regulated dc supply, so a project which can provide this supply by converting the alternating current to direct current that too into a great range of regulated power keep its own preference. As it can produce a range of 0-30 v direct current by regulating and converting alternating current is has a vast application too. AC to DC converters generally comprise a rectifier bridge to rectify the AC current of the input line and a regulating device supplying on output of one or more regulated DC voltages. Just the simple AC is applied, simple electronic circuit is used and through potentiometer you get the desired regulated dc power supply.
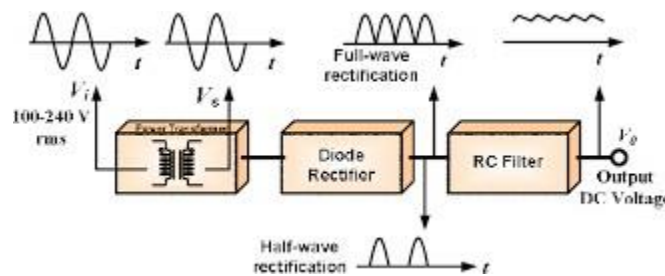
Objective:
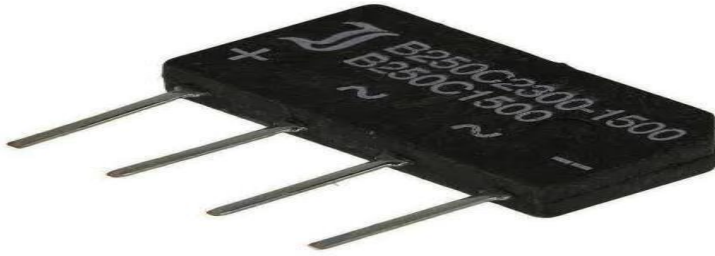
The power supply should have three separate outputs:

Voltage Output	Current Rating
1.2 to 24v	0.5 A
-1.7 to -24v	0.5A
5v	1A

Components:

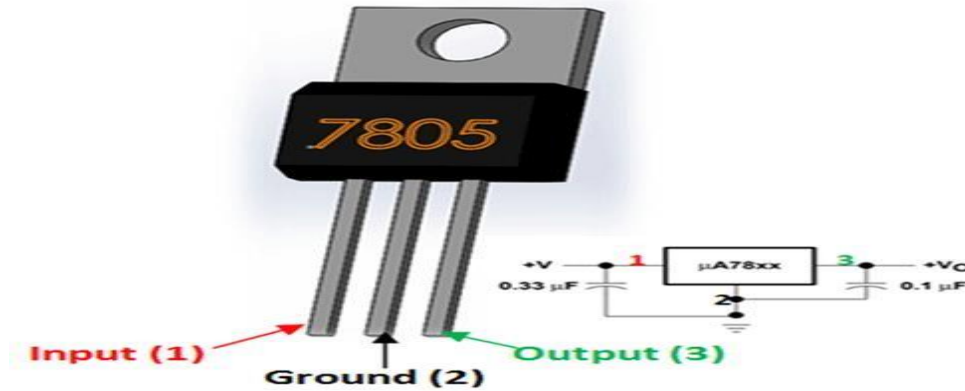- **Center Tapped Transformer 220V to 12x2Vrms x 3A**
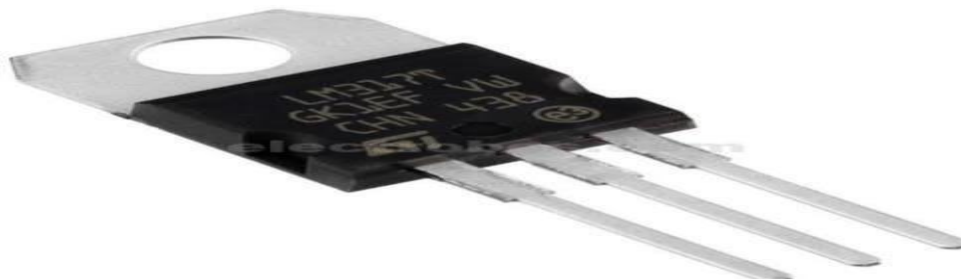
- **Bridge Rectifier x2**

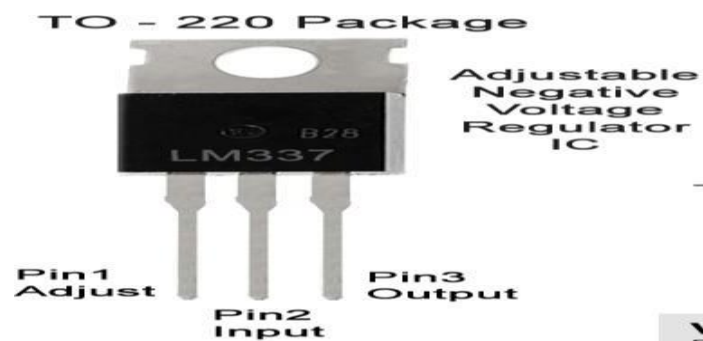- **Capacitor (4700uF x 50V) x2**

- **IC 7805 x1 (5V Fixed 1A Positive Supply Regulator)**

- **IC LM317T x1 (Adjustable Output Positive Voltage Regulator)**

IC LM337T x1 (Adjustable Output Negative Voltage Regulator)

- **Resistor of 270 Ohms x1**

-

- **Potentiometer 5k Ohm x2**

Calculations:

→**Positive Power Supply:**

$$Vout = 1.25 \left(1 + \frac{R2}{R1}\right)$$

For minimum voltage: R2 = 0k (Potentiometer)

Vout = 1.25V

For maximum voltage: R2 = 5k Ohm (Potentiometer)

Vout = 24V

→**Negative Power Supply:**

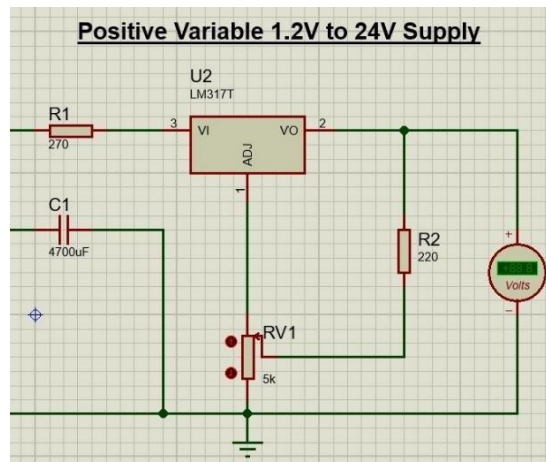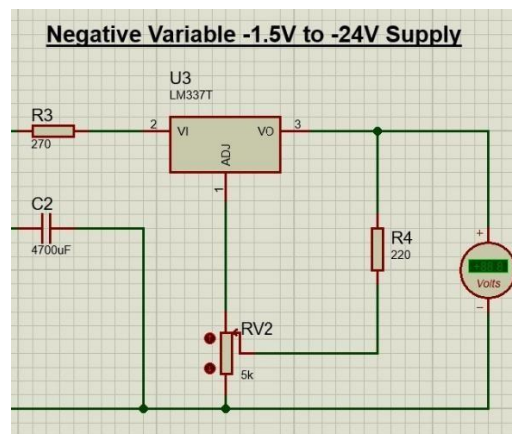$$Vout = -1.25 \left(1 + \frac{R2}{R1}\right)$$

For minimum voltage: R2 = 0k (Potentiometer)

Vout = -1.7V

For maximum voltage: R2 = 5k Ohm (Potentiometer)

Vout = -24V

Procedure:

➔ **CONSTANT VOLTAGE:**
1. After checking the Bridge IC, Place the IC LM7805 and connect the positive terminal of Bridge IC to the input pin of the IC LM7805 and negative terminal to common (ground).
2. Now connect the ground pin of IC LM7805 to the common (ground).
3. Finally, you will be able to get constant 5V from it.

➔ **POSITIVE VOLTAGE:**
1. Take the Center tapped Step-down Transformer, use those two Wires of transformer which gives you AC 24-0-24V.
2. Place a Bridge IC in the breadboard and connect the transformer wires to the AC terminals of Bridge IC.
3. Now check if IC is working fine or not by using DMM and measuring DC Voltage of transformer across it, as the working of Bridge IC is to convert AC Voltages to DC Voltages.
4. Place a Capacitor of 4700 micro–F and connect the positive terminal of Bridge IC to the positive terminal of Capacitor and the negative terminal of IC to the ground.
5. Place the IC LM317 and connect the positive terminal of Capacitor to the input pin of the IC and negative terminal of Capacitor to the ground.
6. Place a resistor and connect the output pin of the IC to one terminal of the resistor.
7. Place the potentiometer and connect the other terminal of resistor to the PIN 2 of the potentiometer.
8. Take another resistor and connect the adjustment of the IC LM317 to the one end of the resistor.
9. Connect the other end of the resistor to the PIN 1 of the Potentiometer.
10. Connect the PIN 3 of the potentiometer to the ground.

➔ **NEGTAIVE VOLATGE:**
1. Take the Step- down Transformer, use those two Wires of transformer which gives you AC 24-0-24V.
2. Place a Bridge IC in the breadboard and connect the transformer wires to the AC terminals of Bridge IC.
3. Now check if IC is working fine or not by using DMM and measuring DC Voltage of 24-0-24 across it, as the working of Bridge IC is to convert AC Voltages to DC Voltages.
4. Place a Capacitor of 4700 micro–F and connect the negative terminal of Bridge IC to the negative terminal of Capacitor and the positive terminal of IC to the ground.
5. Place the IC LM337 and connect the negative terminal of Capacitor to the input PIN of the IC and positive terminal of Capacitor to the ground.
6. Place a resistor and connect the output pin of the IC to one terminal of the resistor. Place the potentiometer and connect the other terminal of resistor to the PIN 2 of the potentiometer.
7. Take another resistor and connect the Adjustment PIN of the IC LM317 to the one end of the resistor
8. Connect the other end of the resistor to the PIN 1 of the Potentiometer.
9. Connect the PIN 3 of the potentiometer to the ground.

Proteus Circuit: