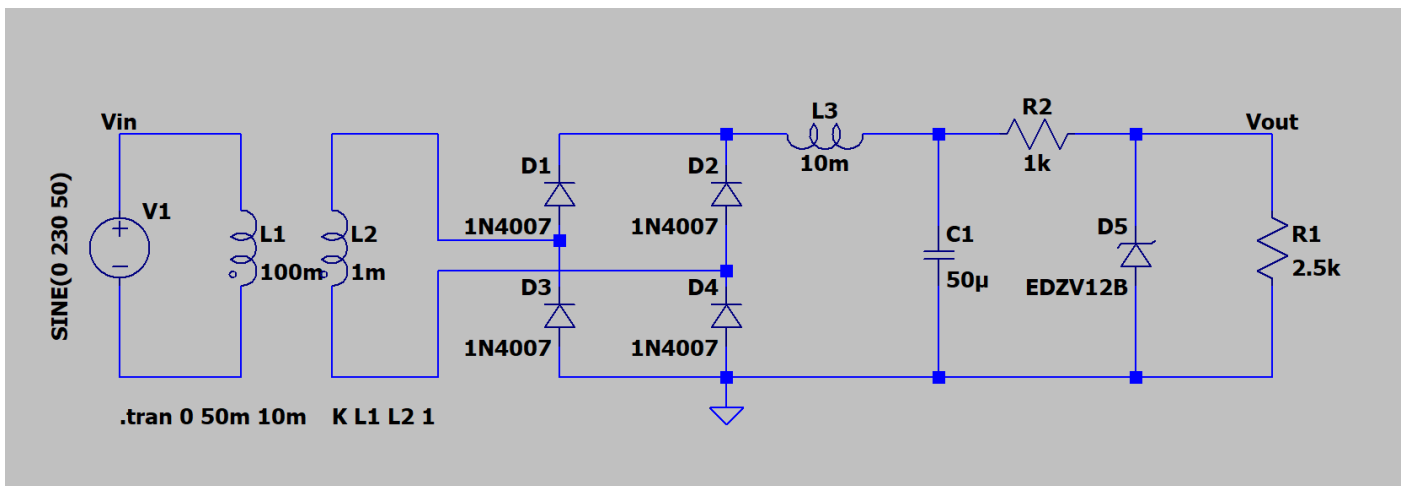


12 VOLT REGULATED POWER SUPPLY



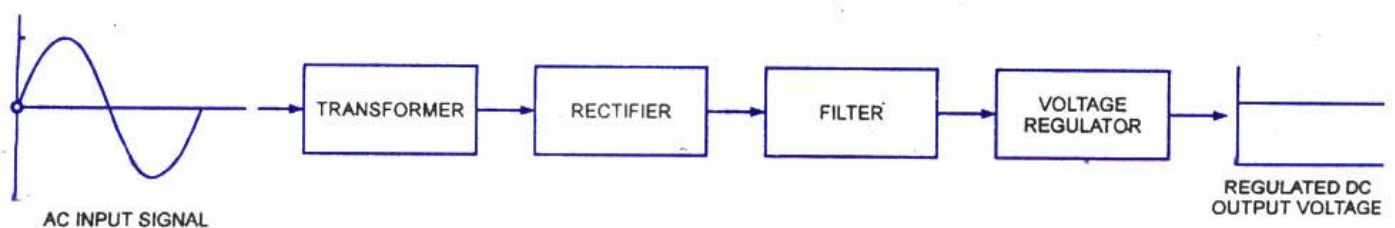
Circuit Components :

AC Mains (230V, 50Hz) , 10:1 step down transformer, 1N4007 diode x4, EDZV12B Zener diode, Resistors (1k, 2.5k), Capacitors (50u).

Definition :

A regulated power supply is a system that provides a stable and constant DC output voltage, regardless of changes in input voltage or variations in load conditions.

Block Diagram :



Operation:

Step-Down Transformer Block : The transformer operates using electromagnetic induction. It has a primary coil connected to the high-voltage AC input and a secondary coil where the lower-voltage AC output is generated. The ratio of turns between the primary and secondary windings determines the voltage step-down ratio.

Rectifier Block : During the positive half-cycle of AC, two of the diodes conduct, allowing current to flow in one direction. During the negative half-cycle, the other two diodes

conduct, allowing the current to continue flowing in the same direction. This results in a full-wave rectified output with both halves of the waveform contributing to the current flow.

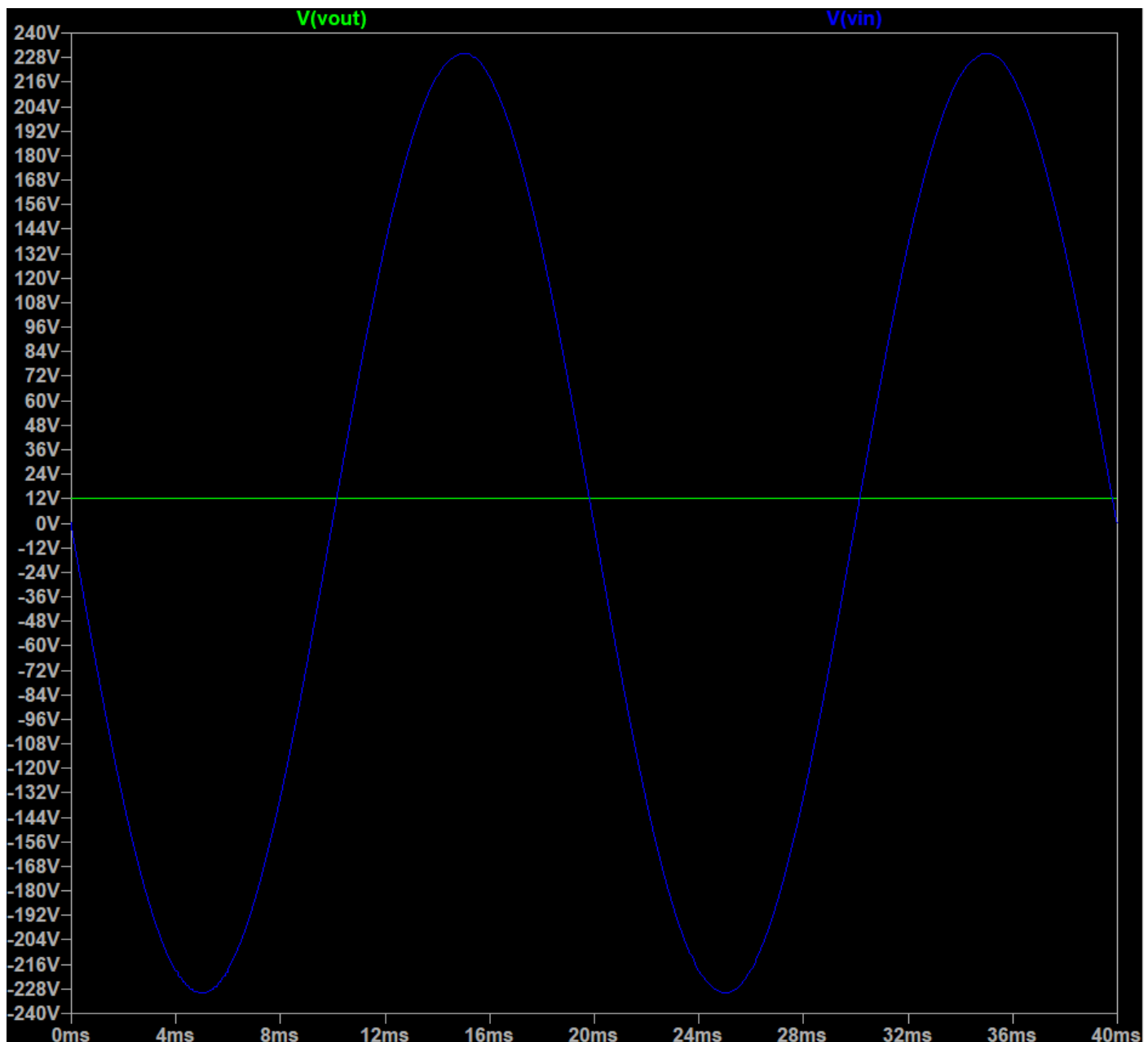
Filter Block : The capacitor reduces the ripple (voltage variations) in the output. The larger the capacitor, the smoother the output will be. After filtering, the output will be a nearly constant DC voltage, although it may still have a small ripple.

Zener Regulator Block :

A Zener diode, which is connected in reverse bias, is used to regulate the voltage. When the voltage exceeds the Zener's breakdown voltage (in this case, 12V), the diode starts conducting, preventing the voltage from rising above 12V.

Waveforms:

Input – AC Mains (230V, 50Hz) | Output – Pure DC (12 V)



Applications:

- Electronic Devices: Ensures that delicate circuits receive a stable and precise voltage.
- Telecommunication Equipment: Powers components requiring strict voltage regulation.
- Lab Equipment: Supplies constant voltage for testing and measuring devices.