

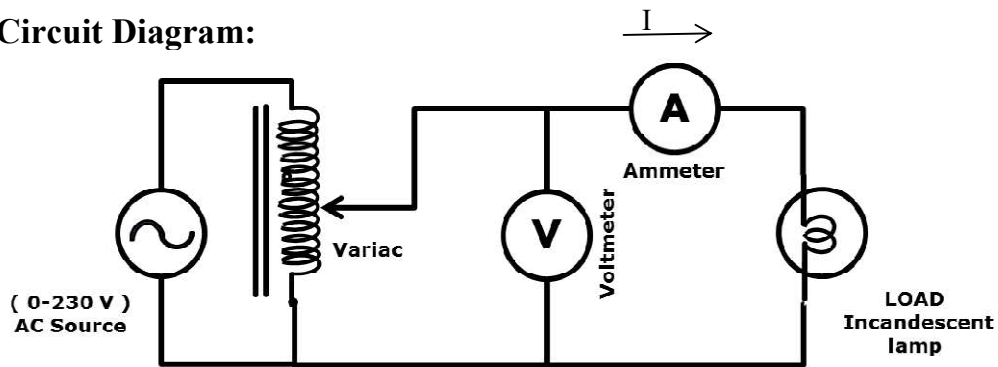
## EXPERIMENT NO. 6

**Objective:** To Draw V-I characteristics of an Incandescent lamp.

**Apparatus Required:**

Sr. No.	Apparatus	Quantity	Range/ Remark
1	Incandescent lamp	1	(220V , 60W)
2	Variac	1	(i/p-230V,o/p-0-270V,15A)
3	A.C. Voltmeter	1	(.....)V
4	A.C. Ammeter	1	(.....)mA
5	Multimeter	1	To Measure Resistance
6	Connecting wires	--	--

**Circuit Diagram:**



**Fig 1 – Circuit Diagram to Draw V-I characteristics of an Incandescent lamp.**

**Observation Table:**

S.N.	V (volts)	I (A)	$R_s = \frac{V \text{ (volts)}}{I \text{ (A)}}$
1			
2			
3			
4			
5			
6			
7			
8			

**Theory:**

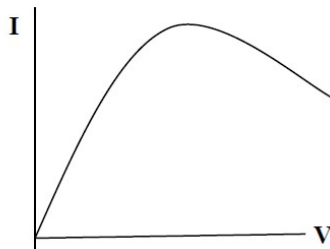
The purpose of this experiment is to study the effect of temperature variation in resistance. Since the temperature is directly proportional to the voltage applied across the resistance, the effect of voltage variation on resistance would be similar to the effect of temperature variation on resistance. The resistance of a material changes as its temperature changes. A rise in temperature increases the molecular movement within the material. As a result, the drift of free electron through the material is increased, in other words the resistance of the material increases. Most of conductors shows these characteristics for a moderate range of temperature, the change in resistance is usually proportional to the change in temperature. The ratio of the change in resistance per degree change in temperature to the resistance at some definite temperature adopted as standard is termed as the temperature coefficient of resistance. It is represented by Greek letter  $\alpha$ .

Assuming that the resistance of a conductor at a standard temperature  $T_0$  ( $0^\circ\text{C}$ ) be  $R_0$  and at temperature  $T_1$  be  $R_1$ ,  $R_0$  &  $R_1$  are related as follows:

$$R_1 = R_0 + \alpha_0 (T_1 - T_0) R_0$$

Where  $\alpha_0$  is the temperature coefficient of resistance of given material at  $0^\circ\text{C}$

Tungsten has positive temperature coefficient of resistance and hence its resistance increases with temperature.

**Model Graph:****Procedure:**

1. Connect the circuit as shown in the circuit diagram.
2. Vary the supply voltage and note the ammeter reading
3. Repeat the above steps to take different values of voltage

**Result:**

The V-I characteristics of an Incandescent lamp on AC supply 0-230 V has been successfully Verified. It does not follow the ohm's law.

**Precaution:**

1. Make the connections properly.
2. Note the readings of voltmeters and ammeters properly avoid parallax.
3. Avoid loose connections and don't touch wire with wet hand.