Power consumed by two 100 W bulbs in series supplied with 220 volts ac will be:

Solution.

$$P_0 = 100W, V = 220V;$$

$$P-?$$

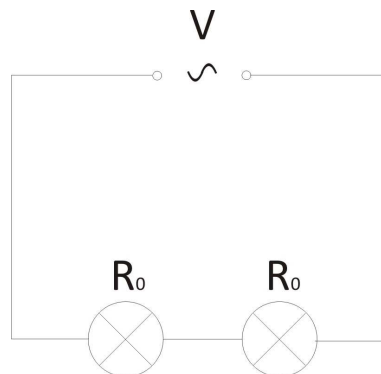$P_0 = 100W$ is power consumed by one bulb supplied with 220 volts.

The resistance of one bulb by the formula of the electric power:

$$P_0 = \frac{V^2}{R_0}.$$

$$R_0 = \frac{V^2}{P_0}.$$

$$R_0 = \frac{(220V)^2}{100W} = 484 Ohm.$$

Two $484 Ohm$ bulbs in series supplied with 220 volts ac.

Power consumed by two bulbs is:

$$P = \frac{V^2}{R}.$$

R − the resistance of two bulbs in series.

$$R = R_0 + R_0 = 2R_0.$$

Power consumed by two bulbs is:

$$P = \frac{V^2}{2R_0}.$$

$$P = \frac{(220V)^2}{2 \cdot 484 Ohm} = 50W.$$

Answer: Power consumed by two 100 W bulbs in series supplied with 220 volts ac will be: $P = 50W$.