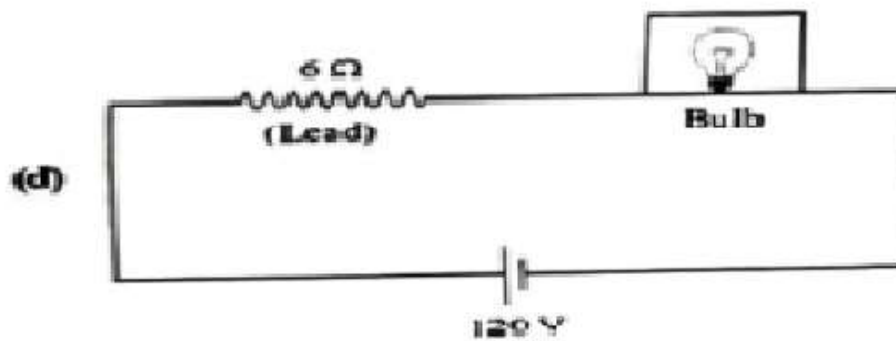


Q 06 The supply voltage to room is 120V. The resistance of the lead wires is 6Ω . A 60 W bulb is already switched on. What is the decrease of voltage across the bulb, when a 240 W heater is switched on in parallel to the bulb? [2013]

- (a) zero (b) 2.9 Volt
 (c) 13.3 Volt (d) 10.04 Volt



Power of bulb = 60 W (given)

$$\text{Resistance of bulb} = \frac{120 \times 120}{60} = 240\Omega$$

$$\left[\because P = \frac{V^2}{R} \right]$$

Power of heater = 240W (given)

$$\text{Resistance of heater} = \frac{120 \times 120}{240} = 60\Omega$$

Voltage across bulb before heater is switched on,

$$V_1 = \frac{240}{240} \times 120 = 117.73 \text{ volt}$$

Voltage across bulb after heater is switched on,

$$V_2 = \frac{48}{54} \times 120 = 106.66 \text{ volt}$$

Hence decrease in voltage

$$V_1 - V_2 = 117.73 - 106.66 = 10.04 \text{ Volt (approximately)}$$