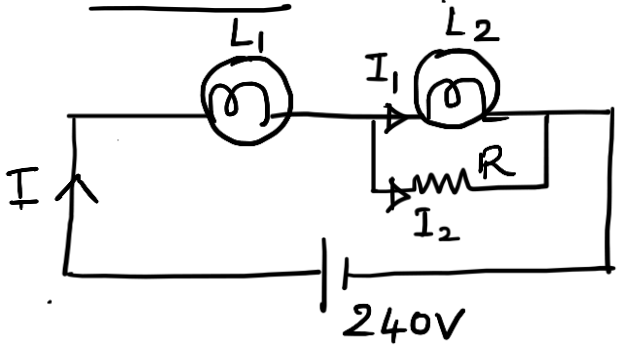
## Lecture 2

1. **A 100W, 120V lamp is connected in series with another lamp of 40W, 120V and the combination is connected across 240V supply mains. Calculate the value of the resistance to be connected across the second lamp, so that each lamp may get the proper current at rated voltage. (Ans : 240 Ω)**

Solution




| $L_1$ | $L_2$ |
|---|---|
| $P_1 = 100W$ | $P_2 = 40W$ |
| $V_{L_1} = 120V$ | $V_{L_2} = 120V$ |

$$I = I_1 + I_2$$

$$I = \frac{P_1}{V_{L_1}} = \frac{100}{120} = 0.833A,$$

$$I_1 = \frac{P_2}{V_{L_2}} = \frac{40}{120} = 0.33A$$

$$I_2 = I - I_1$$

$$= 0.833 - 0.33$$

$$= 0.5A$$

$$\therefore R = \frac{V_{L_2}}{I_2} = \frac{120}{0.5} = 240\Omega$$