PHYSICS - X-PART-10 CLASS 10

Electric power

* The amount of energy consumed by an electrical appliance in unit time is its power.

$$\text{Power, } P = \frac{\text{Work}}{\text{time}} = \frac{H}{t}$$

$$P = VI$$

$$P = I^2R$$

$$P = V^2 / R$$

The unit of electric power is watt (W).

Amperage

* Amperage (A) is the ratio of the power of an equipment to the voltage applied. Amperage increases with the thickness of the conductor.

$$\text{Amperage} = \frac{\text{Wattage}}{\text{Voltage}} = \frac{W}{V}$$

1. An appliance of power 540 W is used in a branch circuit. If the voltage is 230 V, what is its amperage?

Power P = 540 W
Voltage V = 230 V
Amperage = W/V
= 540 / 230 = 2.34 = 2.4 A

2. A heating appliance has a resistance of 115 Ω. If 2 A current flows through it, what is the power of the appliance?

Resistance R =115 Ω
Current I = 2 A
Power $P = I^2R$
$= 2^2 x\ 115 = 4 \times 115 = 460$ W

3. Power of an electrical appliance is 1600 W. The device works at 400 V. If we give 200 V instead of 400 V. what is its power?

Power P = 1600 W
Voltage V = 400 V
Power $P = V^2/ R$
$R = V^2/ P = (400)^2 / 1600 = 100$ Ω
Power at 200V $= (200)^2/ 100 = 400$ W

* If voltage is decreased to half then power decreases to one fourth.

Assignment

1. A current of 0.4 A flows through an electric bulb working at 230 V. What is the power of the bulb?