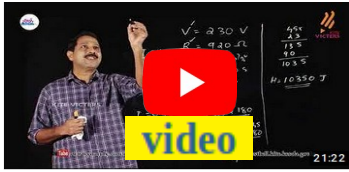


## PHYSICS - X-PART-7 CLASS 07

Mathematical problems which are related to Joules Law.

1. How much will be the heat developed if 0.2 A current flows through a conductor of resistance  $200 \Omega$  for 5 minute?

Current  $I = 0.2 \text{ A}$

Resistance  $R = 200 \Omega$

Time  $t = 5 \times 60 = 300 \text{ s}$

Heat  $H = ?$

$$H = I^2 R t$$

$$= (0.2)^2 \times 200 \times 300$$

$$= 2400 \text{ J}$$

\* If 4.2 J is one calorie then  $H = 2400 / 4.2 = 571.4$  calorie

2. Find out the heat developed in 3 minute by a device of resistance  $920 \Omega$  working under 230 V

Resistance  $R = 920 \Omega$

Voltage  $V = 230 \text{ V}$

Time  $t = 3 \times 60 = 180 \text{ s}$

Heat  $H = ?$

$$H = (V^2/R)t$$

$$= (230^2/920) \times 180$$

$$= 10350 \text{ J}$$

Ohm's law  $R = V/I$

$$I = V / R$$

$$= 230 / 920 = 0.25 \text{ A}$$

$H = ?$

$$H = I^2 R t$$

$$= (0.25)^2 \times 920 \times 180$$

$$= 10350 \text{ J}$$

3. Let's calculate the heat developed when 3 A current flows through an electric iron box designed to work under 230 V for half an hour?

Current  $I = 3 \text{ A}$

Voltage  $V = 230 \text{ V}$

Time  $t = 30 \times 60 = 1800 \text{ s}$

Heat  $H = ?$

$$H = Vit$$

$$= 230 \times 3 \times 1800$$

$$= 1242000 \text{ J}$$

### Assignment

1. Details of two electric heaters are given below. How much will be the heat developed if they are made to work for 5 minute each?

Heater - A	Heater - B
Working voltage : 230 V	Working voltage : 230 V
Resistance : 1150 $\Omega$	Resistance : 460 $\Omega$
Working time : 5 minute	Working time : 5 minute

- Why does the heater having low resistance get heated more?
- In which way does the change in resistance influence the heat developed?
- Find out the current in the heaters A and B and compare the heat developed.
- How do the resistors bring about a change in the current in the circuit?