PHYSICS - X-PART-13 CLASS 31

Watt -Hour Meter

- Watt - hour meter is a device that is used to measure electrical energy. Electrical energy is measured using the unit kilowatt hour. This is also known as a unit.

1 unit electrical energy = 1 kWh

The commercial unit of electrical energy is kilowatt hour (kWh). A device of power 1000 watt (1 kW), when used for one hour (1h), consumes one unit of electrical energy (1 kWh)

$$\text{Energy in kilowatt hour} = \frac{\text{Power in watt} \times \text{time in hour}}{1000}$$

1 kWh = 1000 x 60 x 60 = 3600000 J

1. A grinder of power 750 W works for 2 hours. Calculate the energy consumed

Energy Consumed = (P x t) /1000

Energy Consumed = (750 × 2) / 1000 = 1.5 unit

2. A bulb of power 100 W works for 1 hours. Calculate the energy consumed

Energy Consumed = (P x t) /1000

Energy Consumed = (100 × 1) / 1000 = 0.1 unit

3. A CFL of power 15 W works for 1 hours. Calculate the energy consumed

Energy Consumed = (P x t) /1000

Energy Consumed = (15 × 1) / 1000 = 0.015 unit

4. A LED of power 9 W works for 1 hours. Calculate the energy consumed

Energy Consumed = (P x t) /1000

Energy Consumed = (9 × 1) / 1000 = 0.009 unit

* Low power electrical appliances consume less electrical energy

5. In a house, 5 CF lamps each of 20 W, works for 4 hours, 4 fans each of 60 W work for 5 hours and a TV of 100 W works for 4 hours in a day. What will be the daily consumption shown by the watt hour meter?

Electrical energy consumed by 5 CFL in kWh = P x t /1000
= (20 x 5 x 4) / 1000
= 400 / 1000 = 0.4 unit

Electrical energy consumed by 4 Fan in kWh = P x t /1000
= (60 x 4 x 5) / 1000
= 1200 / 1000 = 1.2 unit

Electrical energy consumed by TV in kWh = P x t /1000
= (100 x 4) / 1000
= 400 / 1000 = 0.4 unit

Daily consumption shown by the watt hour meter
= 0.4+1.2+0.4 = 2 unit (2 kWh)

Assignment

* Find the power of each electrical appliance in your home and how many hours it takes for each appliance to use one unit of electrical energy?