CHAPTER 4. (WORK, ENERGY AND POWER REVISION)(BASED ON NCERT PATTERN)

Question 1. An electric heater is rated 1500 W. How much energy does it use in 10 hours?
Ans:- Energy consumed by an electric heater can be obtained with the help of the expression,
P=W/t
where,
Power rating of the heater, P = 1500 W = 1.5 kW
Time for which the heater has operated, t = 10 h
Work done = Energy consumed by the heater
Therefore, energy consumed = Power × Time
= 1.5 × 10 = 15 kWh
Hence, the energy consumed by the heater in 10 h is 15 kWh or 15 units.

Question 2. Calculate the work required to be done to stop a car of 1500 kg moving at a velocity of 60 km/h.

Ans:-

Mass of car, $m = 1500$ kg

Velocity of car, $v = 60$ km/h $= 60 \times \dfrac{5}{18}$ m/s

Kinetic energy, $E_k = \dfrac{1}{2} mv^2$

$E_k = \dfrac{1}{2} \times 1500 \times \left(60 \times \dfrac{5}{18}\right)^2 = 20.8 \times 10^4$ J

To stop the car, an amount of work equal to E_k is required to be done.

Hence, 20.8×10^4 J of work is required to stop the car.