PQ 10

Questions and Answers

1) A force of 260N is used to push a box of 15kg for a distance of 3.7m along a horizontal surface. Calculate the work done. (hint: E_w=) $Fd = 260 \times 3.7 = 962\ J$

2) A car of mass 600kg is travelling at 80 m s^{-1}. Calculate its kinetic energy. (hint: E_k=) $\frac{1}{2} mv^2 = \frac{1}{2} \times 600 \times 80^2 = 1.92 \times 10^6\ J$

3) A runner of 75kg is at a height of 2,2m. Calculate their potential energy. (hint: E_p=) $mgh = 75 \times 9.8 \times 2.2 = 1617\ J$

4) A lift can carry 12 people of an average mass of 85kg each through a height of 20m in 15s. Calculate the minimum power output of the lift motor. (hint: work done = PE gained) Total mass = $12 \times 85 = 1020$ kg
$= mgh = 1020 \times 9.8 \times 20 = 199920\ J$ | $P = E/t$ | $\frac{199920}{15} = 13328 = 13\ kW$

5) An object is moved through a distance of 3,5m by applying a force of 96N. Calculate the work done. (hint E_w=) $Fd = 96 \times 3.5 = 336\ J$

6) A bus of mass 12.5 tonnes is travelling at 32 m s^{-1}. Calculate its kinetic energy. (hint: E_k=) $\frac{1}{2} mv^2 = \frac{1}{2} 12500 \times 32^2 = 6400000\ J$

7) A car of mass 1.4 tonnes is travelling at 24 m s^{-1}. The driver applies the brakes and the speed reduces to 8.0 m s^{-1}. Calculate the loss in the cars kinetic energy. (hint: initial E_k and final E_k) Final E_k = 44 800 J

Initial E_k = 403 200 J Loss in E_k = 3.6×10^5 J

8) An object falls to the ground from a height of 15m. Calculate its speed just before it lands. $V = \sqrt{2gh} = \sqrt{2 \times 9.8 \times 15} = 17 \text{ m s}^{-1}$

9) A device can do 8.4J of useful work in 2 minutes. Calculate its output in watts. (hint: P= E/t) = 8400/120 = 70 W

10) A van of 2.5 tonnes mass is travelling at 50kmh^{-1}. Calculate its kinetic energy. (E_k=) $\frac{1}{2}mv^2 = \frac{1}{2} \times 2500 \times 50^2 = 3125000$ J