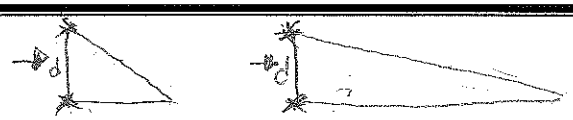


Physics 11 - Practice Questions

Unit: 6.1 Energy – Work

1. How much work is done on a 10.0 kg mass by Earth's gravitational field when the mass drops a distance of 5.0m?

$W = F \cdot d$

$W = mgd$

$m = 10.0\ kg$

$d = 5.0\ m$

$W = (10.0)(9.81)(5.0)$ N

$W = 490.5\ N \cdot m$

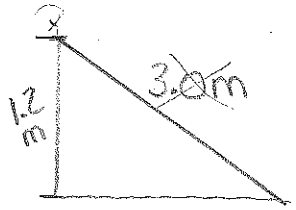
$\boxed{W = 490\ J}$

2. A girl uses a 3.0 m long ramp to push her 110 kg motorbike up to a trailer. The floor of the trailer is 1.2 m above the ground. How much work is done on the motorbike?

$m = 110\ kg$ $\quad d = 1.2m$ $\quad \cancel{d = 3.0m}$?

$W = F \cdot d$

$W = mgd$



$W = (110)(9.81)(1.2m)$

$W = 1294.92 = \boxed{1300\ J = W}$

3. A hiker carries a 25 kg load up a hill at a steady speed through a vertical height of 350 m. How much work does she do on the load?

$m = 25\ kg$

$d = 350\ m$

$W = Fd = mgd$

$W = (25)(9.81)(350)$

$W = 85837.5$

$W = 86000\ J = 8.6 \times 10^4\ J$

or $86\ kJ$

4. The force of gravity on a box is 100.0 N. the coefficient of friction between the floor and the box is 0.250. How much work is done when the box is pushed along the floor, at a steady speed, for a distance of 15.0m?

$F_g = 100.0\ N$

$\mu = 0.250$

$d = 15.0\ m$

$W = F \cdot d$

$F_f = \mu F_n$ $\quad F_n = F_g$

$F_f = (0.250)(100.0\ N)$

$F_f = 25\ N$

$W = (25\ N)(15.0\ m)$

$W = 375\ J$

5. How powerful (in horsepower) is a motor that can lift a 500.0 kg load through a height of 12.0 m in a time of 12s. (1 HP = 750W)

$m = 500.0\ kg$

$d = 12.0\ m$

$\Delta t = 12\ s$

$P = \frac{W}{\Delta t}$ $\quad W = F \cdot d$ $\quad F_g = mg$

$P = \frac{mgd}{\Delta t}$

$$P = \frac{(500.0)(9.81\ m/s^2)(12.0\ m)}{12\ s}$$

$$P = 4905\ W \times \frac{1\ horsepower}{750\ W}$$

$P = 6.54\ hp$

$\boxed{P = 6.5\ hp}$

6. How much energy is consumed by a 100.0 W light bulb, if it is left on for 12.0 hr?

$P = 100.0\,W$

$\Delta t = 12.0\,hr \times 3600\,s = 43200\,s$

$W = ?$

$P = \frac{W}{\Delta t}$

$P\Delta t = W$

$W = (100.0\,J/s)(43200\,s)$

$\boxed{W = 4\,320\,000\,J}$