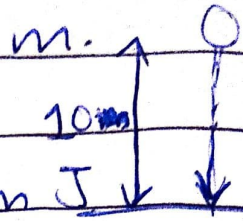
HOMEWORK

Sol 1. $U = 1 \times 9.8 \times 1 = 9.8$ Joule

(4) The gain of gravitational potential energy is 9.8 Joule

Sol°2. Let mass of ball be m.



Energy = mgh

$= m \times 10 \times 10 = 100m$ J

Energy with which it moves up ~~aft the ground~~ after striking the ground = 60% of the total energy (100% - 40% =)

$$E = \frac{60}{100} \times 100m = 60m$$

$E = mgh$

$\Rightarrow 60m = m \times 10 \times h$

$\Rightarrow h = \frac{60}{10} = 6m$ (2)

Sol°3. $K.E._1 = \frac{1}{2} mv^2$

$\Rightarrow K.E._1 = \frac{1}{2} \times mv_1^2$

$K.E._2 = \frac{1}{2} \times 9m v_2^2$

$K.E._1 = K.E._2$

$\Rightarrow \frac{1}{2} m v_1^2 = \frac{1}{2} 9m v_2^2$

$\Rightarrow v_1^2 = 9v_2^2 \Rightarrow v_1 = 3v_2$

$P_1 = m_1 v_1$

$\Rightarrow P_1 = m 3 v_1$

$P_2 = m_2 v_2$

$\Rightarrow P_2 = 9 m v_2$

$\frac{P_1}{P_2} = \frac{m 3 v_2}{9 m v_2} = 1 : 3$

Sol 4. (4) lie down on the ground

Sol 5. (4) mgh

Sol 6. K.E. of body $= \frac{P^2}{2m}$

When kinetic energy is increased by 300%, then

$K.E' = K.E. + 300\% K$

$\Rightarrow K.E' = \frac{100K + 300K}{100} = 4K$

$\frac{P'^2}{2m} = 4K$

$\Rightarrow \frac{P'^2}{2m} = 4 \frac{P^2}{2m}$

$\Rightarrow P'^2 = 4P^2 \Rightarrow P' = 2P$

Change in momentum

$= \frac{P' - P}{P} \times 100\%$

$= \frac{2P - P}{P} \times 100\% = \frac{P}{P} \times 100\%$

$= 100\%$ (1)

Sol:- 7. Kinetic energy of a system of particles is zero. This means

$K.E = \frac{1}{2} m\vec{v}_1^{\,2} + \frac{1}{2} m\vec{v}_2^{\,2} + \cdots \frac{1}{2} m\vec{v}_n^{\,2}$

$\Rightarrow K.E = 0$

For K.E. to be zero, velocity of each particles should be zero.

Linear momentum when K.E is zero $= m\vec{v} = 0$

$\therefore$ 2 implies 1.

In the case of collision.

Let both $\rightarrow \; \leftarrow$ particles of equal masses collide with same velocity.

$\therefore$ Linear momentum of system $= mv - mv$

$= 0$

But K.E of system $= \frac{1}{2}mv^2 + \frac{1}{2}mv^2$

$= 2mv^2$

Therefore, if linear momentum is zero it is not necessary for K.E to be 0.

∴ 1 does not imply 2.

∴ Ans = (4) 1 does not imply 2 but 2 implies 1.