HW [25/11/2021]

1) (4) The gain of gravitational potential energy by the stone is 9.8 J.

2) $h_s = 10m$.

$g = 10 m/s^2$

P.E of ball = $mgh = m \times 10 \times 10^{-1}$

$= 100 mJ$

The ball looses 40% of initial energy on striking

i.e $\Rightarrow \frac{40}{100} \times 100 mJ$

$\Rightarrow 40 mJ$

Energy left to hit the ground = $100mJ - 40mJ$

$= 60mJ$

$\therefore$ Height at which it will rebound

$= \frac{60}{10} = 6m.$

ans - (2) 6m.

3) As K.E is equal,

$K.E_1 = K.E.$

$\frac{p_1^2}{2m_1} = \frac{p_2^2}{2m_2}$

$\frac{p_1^2}{p_2^2} = \frac{2m_1}{2m_2}$

$$\Rightarrow \frac{p_1}{p_2} = \sqrt{\frac{2m_1}{2m_2}}$$

$$\Rightarrow \frac{p_1}{p_2} = \sqrt{\frac{2m}{18m}}$$

$$\therefore \frac{p_1}{p_2} = \sqrt{\frac{1}{9}}$$

$$\Rightarrow \frac{p_1}{p_2} = \frac{1}{3} \Rightarrow 1:3$$

Ans – (2) 1:3

4) (4) lie down on the ground

5) (4) mgh

6) $K.E' = K.E + \frac{300}{100} KE$

$$K.E' = 4K.E \quad -(1)$$

$$\Rightarrow K.E' = \frac{p^2}{2m}$$

$$K.E' = \frac{4p^2}{2m} \text{ (by eq' (1))}$$

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

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

$\Rightarrow p' = \sqrt{4p^2}$

$\Rightarrow p' = 2p$

$\therefore$ Chain in momentum $= \frac{p' - p}{p} \times 100$.

$= \frac{2p - p}{p} \times 100$

$= \frac{p}{p} \times 100$

$= 100\%$.

ans - (1) 100%.

7) (4) 1 does not imply 2 but 2 implies 1.