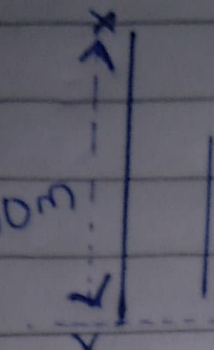
1) d) The gain in GPE is 9.8 J

2) 

P.E = mgh, Let mass be = x

P.E = $mgh_1 = 100x$ J

A/Q Ball looses 40% of its initial energy on striking the ground.

$\Rightarrow 100x\,J - \frac{40}{100} \times 100x\,J$

$\Rightarrow 100x\,J - 40x\,J = 60x\,J$

Let it rebounds at a height h_2

$\Rightarrow mgh_2 = 60x\,J$

$\Rightarrow x \times 10 \times h_2 = 60x\,J$

$\Rightarrow h_2 \Rightarrow 6m$

3) $m_1 = m$, $m_2 = 9m$

$$K.E = \frac{P^2}{2m}$$

$$K.E_1 = \frac{P_1^2}{2m} \qquad K.E_2 = \frac{P_2^2}{2 \times 9m}$$

A/Q Both K.E are equal

$\Rightarrow K.E_1 = K.E_2 \Rightarrow \frac{P_1^2}{2m} = \frac{P_2^2}{2 \times 9m}$

Ratio of momenta $= \frac{P_1}{P_2} = \sqrt{\frac{2m}{2 \times 9m}} \Rightarrow \sqrt{\frac{m}{9m}} = 1:3$

4) b) Sitting on a chair

5) d) mgh

6) $K.E = \frac{P^2}{2m}$

$K.E' = KE + \frac{300}{100} \text{ of } KE = 4KE$

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

$4P^2 = P'^2$

$2P = P'$

Increase in momentum

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

7) d) 1 does not imply 2 but 2 implies 1