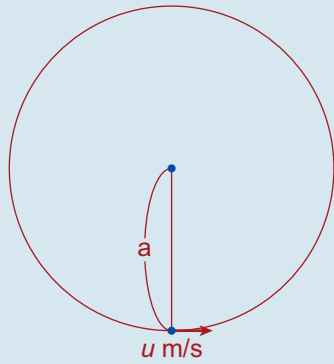


Q. 9.



$$(i) \text{ K.E. + P.E.} = \frac{1}{2}M(2ga) + Mg(0)$$

$$= Mga$$

$$(ii) Mga = \frac{1}{2}M(0)^2 + Mgh$$

$$\Rightarrow h = a$$

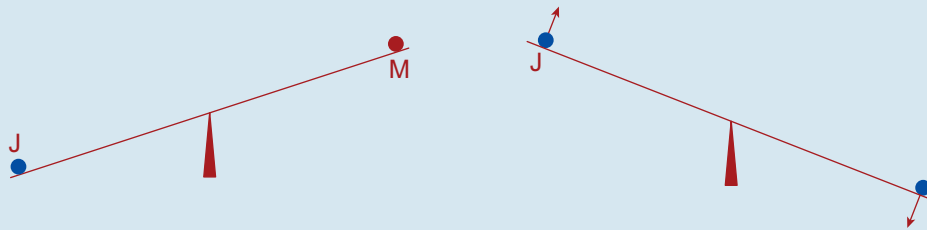
$$= a$$

$$(iii) Mga = \frac{1}{2}Mv^2 + Mg\left(\frac{1}{2}a\right)$$

$$\Rightarrow v^2 = ga$$

$$\Rightarrow v = \sqrt{ga} \text{ m/s}$$

Q. 10.



Energy Before

=

Energy After

$$\begin{array}{c} \text{Johnny} \qquad \qquad \text{Margery} \qquad \qquad \text{Johnny} \qquad \qquad \text{Margery} \\ \hline \frac{1}{2}M(0)^2 + Mg(0) + \frac{1}{2}\left(\frac{3}{2}M\right)(0)^2 + \frac{3}{2}Mg\left(\frac{1}{2}\right) = \frac{1}{2}Mv^2 + Mg\left(\frac{1}{2}\right) + \frac{1}{2}\left(\frac{3}{2}M\right)v^2 + \frac{3}{2}Mg(0) \end{array}$$

$$\Rightarrow \frac{3}{4}Mg = \frac{1}{2}Mv^2 + \frac{1}{2}Mg + \frac{3}{4}Mv^2$$

$$\Rightarrow Mg = 5Mv^2$$

$$\Rightarrow v = \sqrt{\frac{g}{5}}$$

$$= \sqrt{\frac{9.8}{5}}$$

$$= \sqrt{1.96}$$

$$= 1.4 \text{ m/s}$$