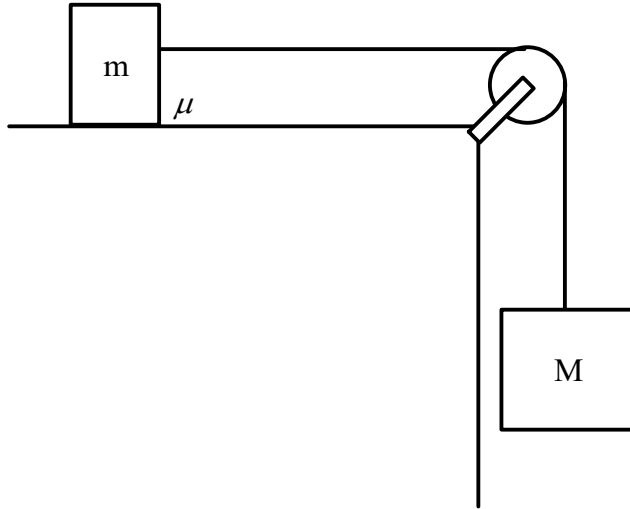


Two blocks connected by light inextensible string as shown in the figure are released from rest. Their common speed  $v$  after each one of them has moved  $d=30$  cm distance ( $m$  moves horizontally and  $M$  moves vertically downwards) is given by: [  $\frac{m}{M} = \mu = \frac{1}{3}$  ,  $g = 10 \text{ ms}^{-2}$  ]



- (A) 1 m/s                      (B) 2 m/s  
(C) 4 m/s                      (D)  $\sqrt{2}$  m/s

*Solution*

We have,  $W_{all} = \Delta K$

$$\therefore W_g + W_{fr} = \frac{1}{2}(M + m)v^2$$

$$\therefore Mgd - \mu mgd = \frac{1}{2}(M + m)v^2$$

$$\therefore v = \sqrt{\frac{2gd(M - \mu m)}{M + m}} = \sqrt{\frac{2gd\left(\frac{M}{m} - \mu\right)}{\frac{M}{m} + 1}}$$

$$\therefore v = \sqrt{\frac{2 \times 10 \times 30 \times 10^{-2} \left(3 - \frac{1}{3}\right)}{3 + 1}} = 2 \text{ ms}^{-1}$$

Hence, (B)