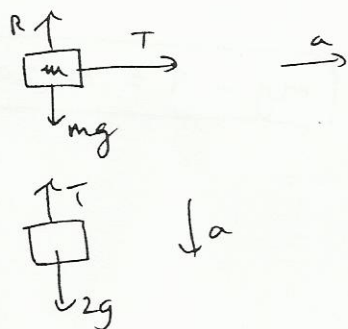
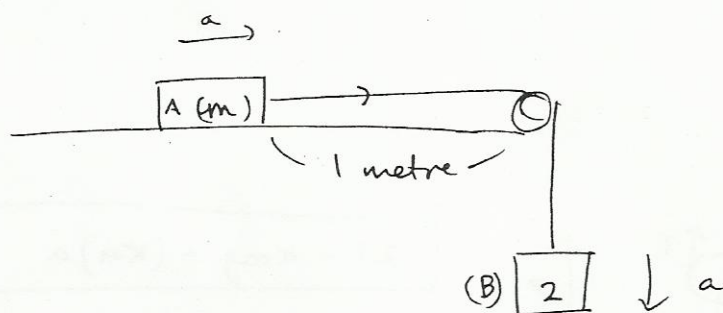


4(a)

1927

4. (a) A particle A, of mass m kg, rests on a smooth horizontal table. It is connected by a light inextensible string which passes over a light, smooth, fixed pulley to a second particle B, of mass 2 kg, which hangs freely under gravity. The system starts from rest with A at a distance of 1 metre from the pulley.

- (i) Calculate the acceleration of A.
- (ii) If A reaches the pulley in $\frac{5}{7}$ seconds, find m .



$$\textcircled{1} T = ma$$

$$\textcircled{2} 2g - T = 2a$$

$$\text{Add! } 2g = (2+m)a$$

$$\therefore a = \left(\frac{2}{2+m}\right)g$$

$$u = 0$$

$$s = 1$$

$$a = \left(\frac{2}{2+m}\right)g$$

$$t = \frac{5}{7}$$

$$s = ut + \frac{1}{2}at^2$$

$$1 = 0 + \frac{1}{2} \left(\frac{2}{2+m}\right)g \left(\frac{25}{49}\right)$$

$$1 = \frac{1}{2+m} \cdot (9.8) \left(\frac{25}{49}\right)$$

$$1 = \frac{245}{49(2+m)} \Rightarrow 1 = \frac{5}{2+m}$$

$$\therefore m + 2 = 5$$

$$m = 3$$