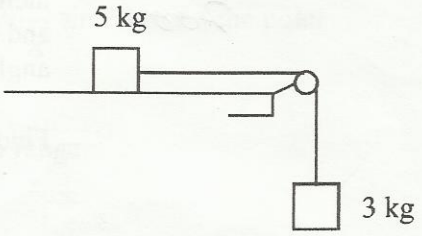
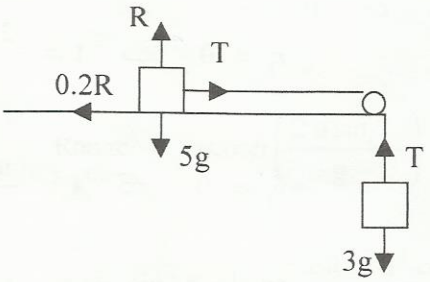
2000

4. **(a)** A mass of 5 kg on a rough horizontal table is connected by a light inextensible string passing over a smooth light pulley, at the edge of the table, to a 3 kg mass hanging freely. The coefficient of friction between the 5 kg mass and the table is $\frac{1}{5}$.



The system is released from rest.

Find the distance fallen by the 3 kg mass in the first 2 seconds after the system is released from rest.



$T - g = 5a$

$3g - T = 3a$

$\Rightarrow \quad a = \frac{1}{4}g$

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

$= 0 + \frac{1}{2}(\frac{1}{4}g)(4)$

$= \frac{1}{2}g \quad or \quad 4.9$