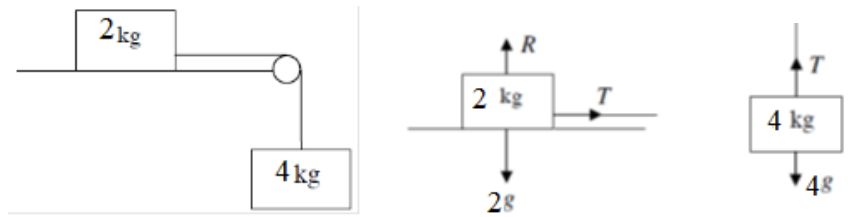**Answer on Question #47906-Physics-Mechanics-Kinematics-Dynamics**

A block of mass 2 kg is connected to a freely hanging block of mass 4 kg by a light and inextensible string which passes over pulley at the edge of a table. The 2kg mass is on the surface of the table assumed to be smooth. Calculate the acceleration of the system and the tension in the string options

a) 6.7 m/s2 and 13.3 N

b) 3.3 m/s2 and 34.4 N

c) 0.54 m/s2 and 40.6 N

d) 2.5 m/s 2 and 32.2 N

Solution

The blocks are connected by a string.

The tension due to the string is the same at both ends ("one string – one tension") so as the 4 kg block accelerates downwards the 2 kg block will accelerate across at the same rate.

We label this tension T (because we're an imaginative bunch we are).

For the 3 kg mass: $ = 2a$.

For the 4 kg mass: $4g - T = 4a$.

Now sub $T = 2a$ into the second equation to get $40 - 2a = 4a$ [taking $g = 10 \ ms^{-2}$ at ordinary level]

Solve to get $a = 6.7 \frac{m}{s^2}$

Now sub this value for a into the $T = 2a$ equation to get $T = 13.3 \ N$.

Answer: a) 6.7 $\frac{m}{s^2}$ and 13.3 N.