

LAST Name: _____

First Name: _____

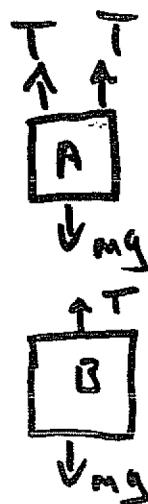
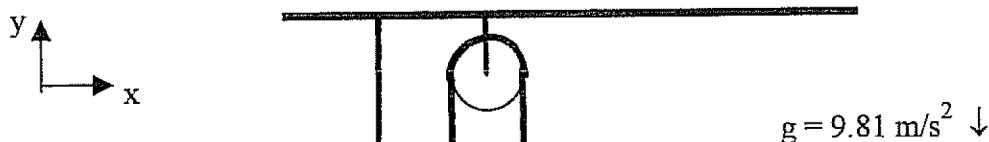
Student Number: _____

MIE 200F - Quiz number 2b – September 26, 2002
quiz duration = 20 minutes

Block A has mass 10 kg, and block B has mass 20 kg. Both are suspended from the ceiling by a rope and pulleys as shown. The rope and pulleys have zero mass. At time $t = 0$, the velocity of B is 14 m/s .

Find the tension in the rope at time $t = 0$.

$$\vec{F} = m\vec{a} \quad x = x_0 + v_0 t + \frac{1}{2} a_0 t^2$$



$$\sum \vec{F}_A = m \vec{a}_A \Rightarrow 2T - 10g = 10a_A \quad (1)$$

$$\sum \vec{F}_B = m \vec{a}_B \Rightarrow T - 20g = 20a_B \quad (2)$$

but $a_B = -2a_A$

rewrite eqn (2) as $T - 20g = -40a_A \quad (2a)$

combine eqs (1) & (2a) to give:

$$T = 6.667g \\ = 65.4 \text{ N}$$