Physics 2010
Fall 2005
Sid Rudolph

EXAM 2

2

Name:_____ Student ID #:_____

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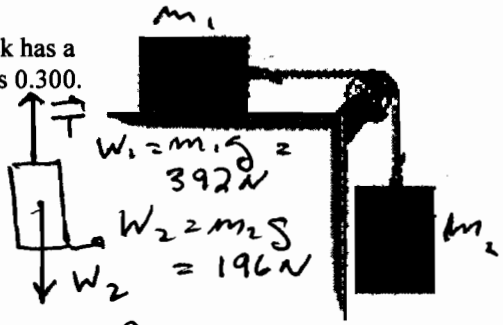
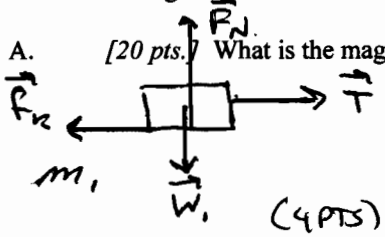
In the drawing shown the block on the table has a mass of 40.0 kg mass and the hanging block has a mass of 20.0 kg. The coefficient of kinetic friction between the table and the 40.0 kg block is 0.300.



A. *[20 pts.]* What is the magnitude of the acceleration of the descending block?



$T - f_K = m_1 a$ (7 PTS)

$W_2 - T = m_2 a$ (7 PTS)

$W_2 - f_K = (m_1 + m_2) a$ (4 PTS)

$f_K = \mu_K F_N = \mu_K m_1 g = 118 N$

$$a = \frac{W_2 - f_K}{m_1 + m_2} = \frac{196 N - 118 N}{60 kg}$$

$$\boxed{a = 1.31 m/s^2}$$ (2 PTS)

B. *[10 pts.]* What is the magnitude of the tension the block on the table feels?

$T = m_1 a + f_K$ (7 PTS)

$= (1.31 m/s^2)(40 kg) + 118 N$

$$\boxed{T = 170 N}$$ (3 PTS)

C. *[4 pts.]* If the descending block, starting from rest, falls 1.20 m, what is the <u>net work</u> the tension felt by both blocks does?

$W_{\vec{T}}(\text{TOTAL}) = T\Delta x - T\Delta x = 0$

$$\boxed{W_{\vec{T}}(\text{TOTAL}) = 0}$$