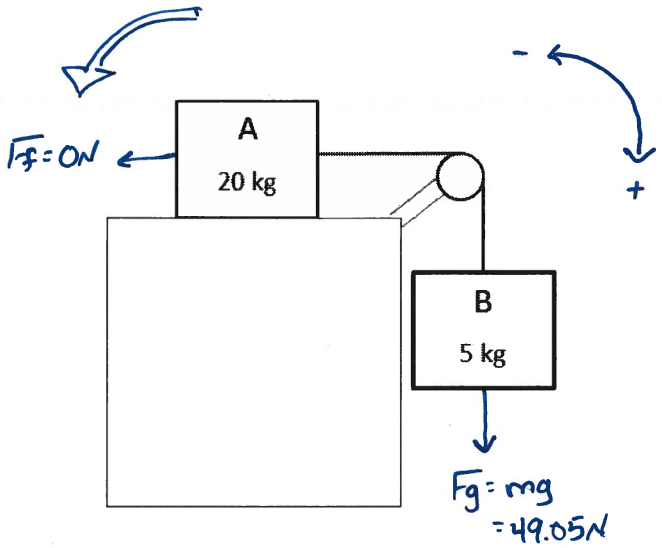
KEY

First Name:_____ Last Name:_____

L09 – FQ – Systems with Pulleys

Q1: In this frictionless system, what is the tension in the rope? *(2 marks)*



System

$a = \frac{F_{net}}{m} = \frac{49.05N}{25kg} = 1.962 m/s^2$

20kg Item

$a = 1.962 m/s^2$

– ⟷ +

A 20kg → F_T

$F_{net} = ma$
$= (20)(1.962)$
$= 39.24 N$

$\vec{F}_{net} = \vec{F}_T + \vec{F}_f$

$39.24 = F_T + (-0)$

$\boxed{F_T = 39.24 N}$

Alternate Method

5kg Item

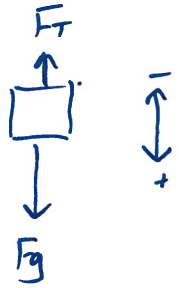
$a = 1.962 m/s^2$

$F_{net} = ma$
$= (5)(1.962)$
$= 9.81 N$

$\downarrow F_{net} = \downarrow F_g + \uparrow F_T$

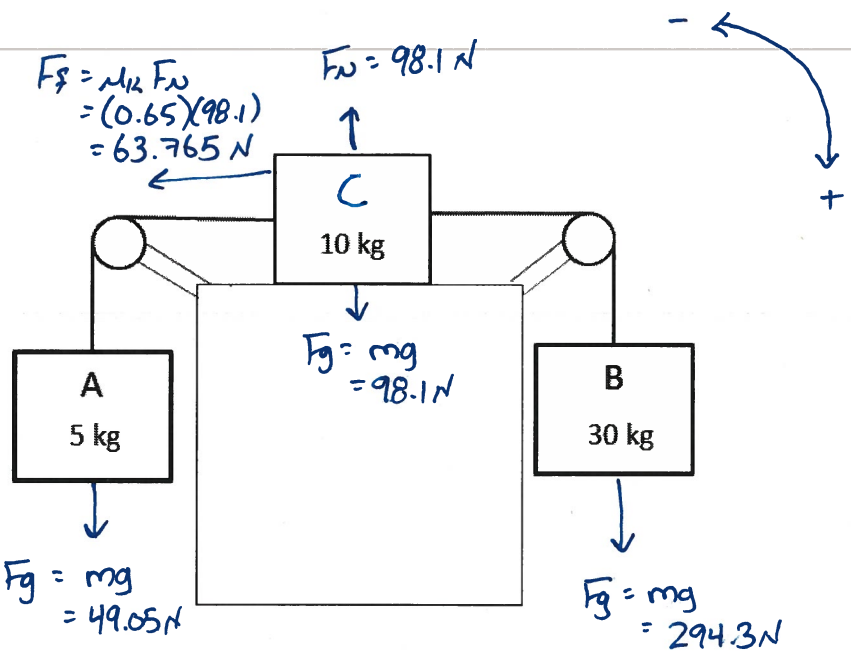
$9.81 = 49.05 + F_T$

$\boxed{-39.24N = F_T}$



KEY

Q2: The coefficient of friction between the 10kg block and the table is 0.65. What is the acceleration of the system? *(3 marks)*



System

$F_{net} = F_{g_B} + F_{g_A} + F_{f_C}$

$= (+294.3) + (-49.05) + (-63.765)$

$= 181.485\ N$

$a = \frac{F_{net}}{m} = \frac{181.485}{45} = \boxed{4.033\ m/s^2}$

MARKING:

Beginning	0.0 – 2.0
Progressing	2.5 – 3.0
Competent	3.5 – 4.5
Exemplary	5.0