

Closed book. No calculators are to be used for this quiz.

Name:

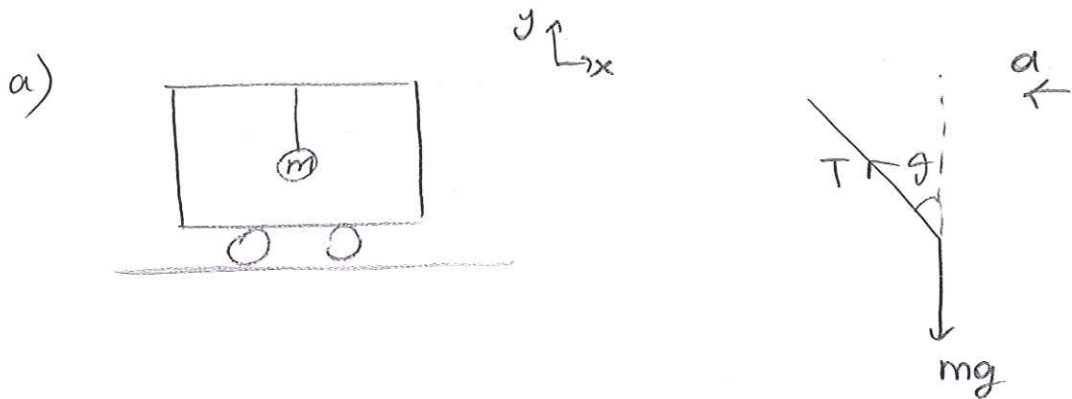
Student ID:

Signature:

A ball with mass m is hanging from a long string that is tied to the ceiling of a train car traveling on horizontal tracks. An observer inside the train car sees the ball hang motionless.

(a) Draw a clearly labeled free-body diagram for the ball if the train is slowing down uniformly (that is, with constant acceleration) as it moves to the right side of your drawing. Make sure that all forces are drawn in the correct direction.

(b) Write down Newton's equations for the ball.



b) $\sum \vec{F} = m\vec{a}$

$$\sum F_x = ma_x$$

$$\sum F_y = 0$$

$$T \sin \theta = ma$$

$$T \cos \theta - mg = 0$$

PHYS 101: General Physics KOÇ UNIVERSITY Fall Semester 2015
 College of Arts and Sciences
 Quiz 3

Closed book. No calculators are to be used for this quiz.

Name:

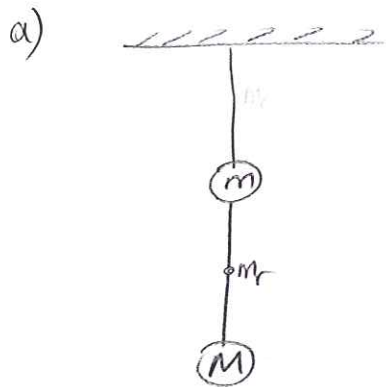
Student ID:

Signature:

A block with mass m hangs from the ceiling, attached with a uniform rope whose mass is m_r . A second block with mass M is attached to the bottom of the first block with an identical rope. The whole setup is motionless.

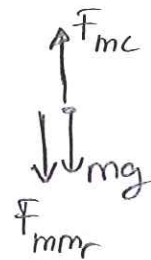
(a) Draw three free body diagrams: for the two masses and the rope in between.

(b) Indicate all the action-reaction force pairs.

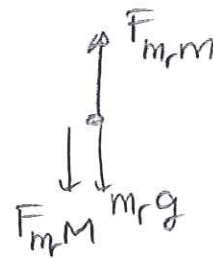


Free Body Diagrams

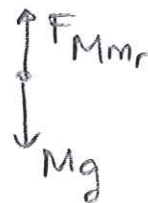
for m:



For Rope:



For M:



$$|\vec{F}_{m m_r}| = |\vec{F}_{m_r m}|$$

$$|\vec{F}_{M m_r}| = |\vec{F}_{m_r M}|$$

- b)
- Weight of m is action and \vec{F}_{mc} is reaction force to this.
 - Weight of rope $m_r g$ is action and $\vec{F}_{m_r m}$ is reaction force to this.
 - Weight of second mass Mg is action and $\vec{F}_{M m_r}$ is reaction force.

Closed book. No calculators are to be used for this quiz.

Name:

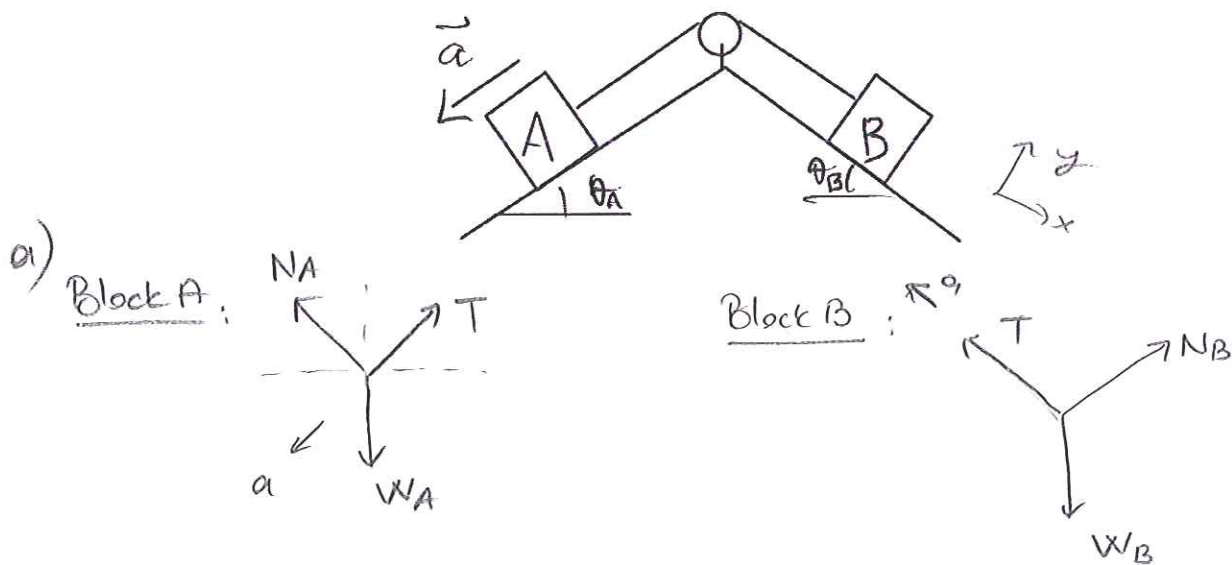
Student ID:

Signature:

Blocks A and B with masses m_A and m_B are joined by a massless rope while block A is moving downwards with acceleration a as shown. There is no friction.

(a) Draw free body diagrams for each block separately. Make sure that you indicate the direction of each force correctly.

(b) Write down Newton's equations for the motion parallel to the surface.



b) $\sum F_x = ma_x$

$\sum F_x = ma_x$

A: $T - m_A g \sin \theta_A = -m_A a$

B: $m_B g \sin \theta_B - T = -m_B a$

PHYS 101: General Physics KOÇ UNIVERSITY Fall Semester 2015
 College of Arts and Sciences
 Quiz 3

Closed book. No calculators are to be used for this quiz.

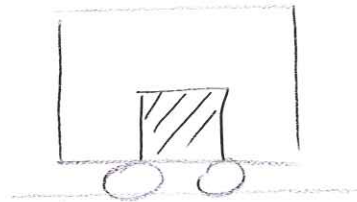
Name: _____ Student ID: _____ Signature: _____

A box inside a truck starts sliding forward (with friction) when the truck suddenly breaks and starts decelerating.

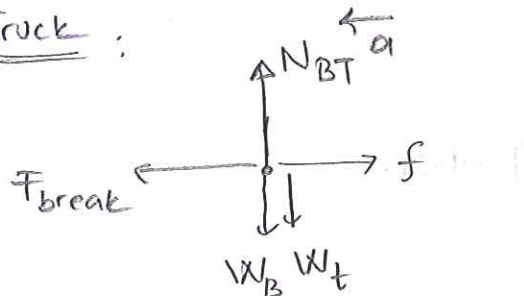
(a) Draw the free body diagrams for the box and for the truck, assuming the truck moves to the right with a decreasing speed at constant acceleration. Make sure that you correctly indicate the direction of all forces.

(b) Identify the action-reaction force pairs.

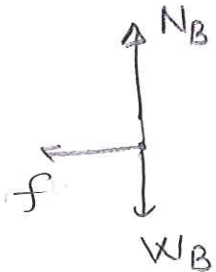
a)



FBD for Truck :



Box



f : friction force on box from truck.

b) F_{break} is an action force and friction force between truck and box is a reaction force to this.

Weight of box on truck is an action force and N_{BT} is the reaction force.

PHYS 101: General Physics KOÇ UNIVERSITY Fall Semester 2015
 College of Arts and Sciences
 Quiz 3

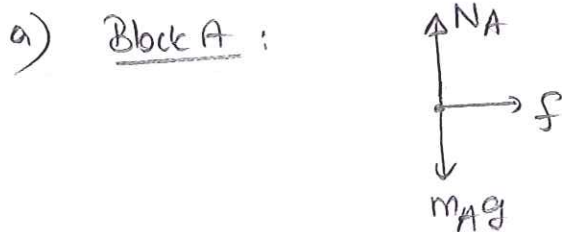
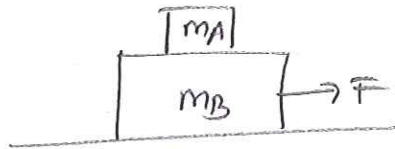
Closed book. No calculators are to be used for this quiz.

Name: _____ Student ID: _____ Signature: _____

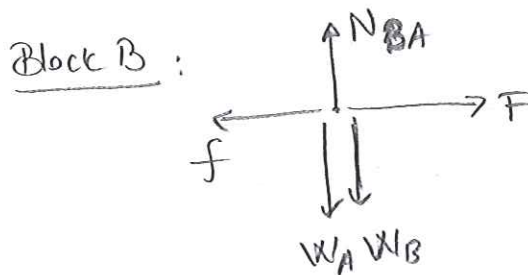
A block A with mass m_A sits on another block B . A constant horizontal force F towards right is being applied to the lower block B . While block A is held on top of block B by frictional force, B moves without resistance on the lower surface.

(a) Draw the free body diagrams for the two blocks. Make sure that you indicate the direction of each force correctly.

(b) Write down Newton's equations for the horizontal motion.



f :- friction force between m_A & m_B .



b) $\sum F_y = m a_y$

A: $f = m_a a$

B: $F = m_B a$