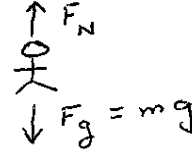


PY211 Spring 2007
Conceptual Exercises 2

Consider a person standing in an elevator that is accelerating upward.

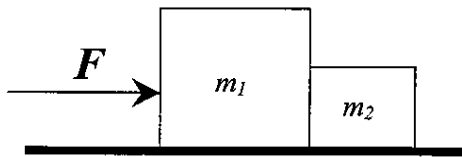
1. Draw a free-body diagram of the person.



2. The upward normal force n exerted by the elevator floor on the person is:

- a) larger than the weight of the person $\Sigma F = ma > 0$ (accel up)
 b) equal to the weight of the person
 c) smaller than the weight of the person $\Sigma F = F_N - mg > 0 \Rightarrow F_N > mg$
- \uparrow
weight

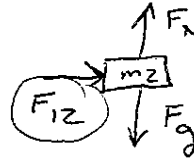
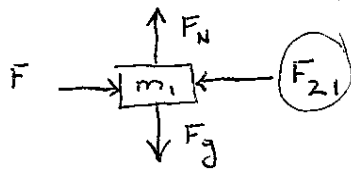
Two blocks sitting on a frictionless table are pushed from the left by a horizontal force as shown below.



3. Draw free body diagrams for each of the two blocks below, label the action-reaction pairs and calculate their acceleration.

Action-Reaction:

F_{12}, F_{21}

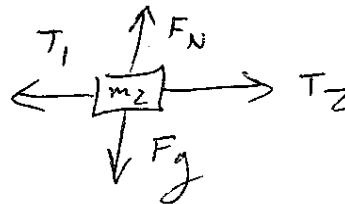
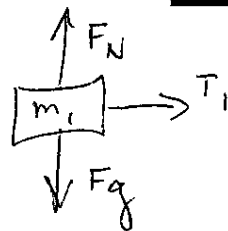
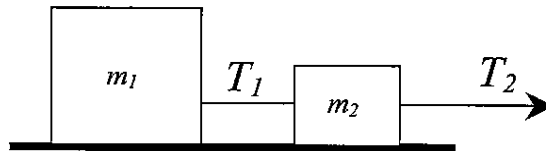


$F_1 - F_{21} = m_1 a$
 $F_{12} = m_2 a$

$a = F / (m_1 + m_2)$

4. Now consider two boxes sitting on a frictionless table connected by a string with tension T_1 . A second string with tension T_2 pulls the boxes to the right, as shown below. Draw free-body diagrams for each of the two boxes and calculate their acceleration.

NB: normal force and gravity are NOT action-reaction pairs!



$T_2 - T_1 = m_2 a$
 $T_1 = m_1 a$

$a = T_2 / (m_1 + m_2)$