[This plus deriv. of circular accel. will take up the period]

N3-1

Forces from motion :

$\vec{F}_{net} = \frac{d\vec{p}}{dt}$

$\vec{p} = m\vec{v}$

$\frac{d\vec{p}}{dt} = m\frac{d\vec{v}}{dt} = m\vec{a}$

motion $\Rightarrow \vec{a}_{cm} \Rightarrow \vec{F}_{net} = m\vec{a}_{cm}$

[in N2 figured out how to calc. accel; use this to infer forces]

N3.T1 C ← they didn't quite get this.

$\vec{a}\uparrow \Rightarrow F_N > F_g$

Normal force is adjustable

N3.T4 B

$\vec{a} \leftarrow \Rightarrow F_{SF} \leftarrow$

Direction of SF opposite to tendency of motion

N3.T5 A

Tension is adjustable

N7.S4

$\frac{65N}{27kg} = 2.4\frac{m}{s^2}$, $(2.4\frac{m}{s^2})(15kg) = \underline{\underline{36N}}$; $\mu > \frac{36}{15(9.8)} = 0.246$

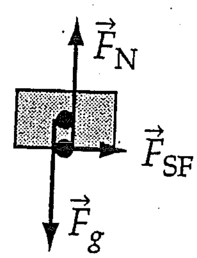
N3.T7 Newton's 3rd law

N3.T8 B ← split 4 ways!

N3T.1 A car passes a dip in the road, going first down, then up. At the very bottom of the dip, when the car's instantaneous velocity is passing through horizontal, how does the magnitude of the total normal force on the car compare to the magnitude of the car's weight?

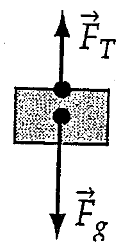
A. $F_{N,tot} < F_g$
B. $F_{N,tot} = F_g$
C. $F_{N,tot} > F_g$
D. $F_{N,tot} = 0$
E. We do not have enough information to answer.

N3T.4 The drawing below is supposed to be a free-body diagram of a box that sits without slipping on the back of a truck that is moving to the right but is slowing down. Is the diagram correct?



A. Yes.
B. No: $\vec{F}_{SF}$ should point leftward.
C. No: the $\vec{F}_{SF}$ label should be $\vec{F}_{KF}$.
D. No: there should be a leftward drag force.
E. No: F_N should not be equal to F_g.
F. No: there is some other problem (specify).

N3T.5 The drawing shown is supposed to be a free-body diagram of a crate that is being lowered by a crane and is speeding up as it is being lowered. Is the diagram correct? (Ignore air resistance.)



A. Yes.
B. No: $\vec{F}_T$ should be labeled $\vec{F}_N$.
C. No: $\vec{F}_T$ should be equal to F_g.
D. No: $\vec{F}_T$ should be greater than F_g.
E. No: there should be an upward $\vec{F}_D$.
F. No: there is some other problem (specify).

N3T.6 Which of the following are third-law partners? Answer T if the two forces described are third-law partners, F if they are not.

a. A thrust force from its propeller pulls a plane forward; a drag force pushes it backward.
b. A car exerts a forward force on a trailer; the trailer tugs backward on the car.
c. A motorboat propeller pushes backward on the water; the water pushes forward on the propeller.
d. Gravity pulls down on a person sitting in a chair; the chair pushes back up on the person.

N7S.4 A 32-kg child puts a 15-kg box into a 12-kg wagon. The child then pulls horizontally on the wagon with a force of 65 N. If the box does not move relative to the wagon, what is the static friction force on the box?

A) 65 N

B) 81 N

C) 36 N

D) zero

E) none of the above

N3T.7 A large truck with mass m_1 pushes a disabled small car with mass $m_2 < m_1$, giving it a forward acceleration a. Each vehicle exerts a force on the other as a result of their contact interaction. Which vehicle exerts the *greater* force on the other?

A. The car.

B. The truck.

C. Both forces have the same magnitude.

D. The car does not exert any force on the truck.

E. We do not have enough information to answer.

N3T.8 In the situation described in problem N3T.7, what is the *magnitude* of the force $\vec{F}$ that the car exerts on the truck?

A. $F = m_1 a$

B. $F = m_2 a$

C. $F = (m_1 + m_2)a$

D. $F = 0$

E. $F = -m_2 a$

F. Other (specify)