

Phys 11 – Answers to Chapter 6 Forces p.145-147

- 10) a. Your body accelerates forward faster than your head (due to the head's inertia) causing injury to the neck and back.
b. The headrest accelerates your head to keep up with the rest of your body.
- 11) Soft lead would be better because it requires less force to write.
- 12) omit
- 13) If we can get a mass into space where friction does not exist, then inertia can be tested. Otherwise, on any surface, the resistance to motion is a combination of friction and inertia.
- 14) The friction force is greater than the normal force on the object.
- 15) Width does not make any difference according to Newton. (we know that is not completely true)
- 16) The density of the water-filled ball is greater so it can more easily overcome the air friction and have a greater terminal velocity, hence the water-filled ball will reach the ground sooner.
- 17) The weight of 1.0 kg mass on Earth is 2.2 lbs.
- 18) Electromagnetic force.
- 19) The forces on the cart will still be unbalanced so the cart will accelerate. The horse is wrong
- 20) a) 45 m/s^2
b) $3.9 \times 10^4 \text{ N}$
c) $3.1 \times 10^3 \text{ N}$
- 21) 33.02 m/s^2 , 163.0 m/s
- 22) $3.1 \times 10^3 \text{ N}$
- 23) a) 14.0 m/s
b) $-3.8 \times 10^3 \text{ N}$
- 24) 126.6 m/s is slower than found in Problem 21, so the acceleration is not constant. Further, the acceleration in the first half-second was 45 m/s^2 , not 33.02 m/s^2 .
- 25) $6.3 \times 10^3 \text{ N}$
- 26) $(9.80 \text{ m/s}^2) (m)$
- 27) $2.50 \times 10^2 \text{ kg}$
- 28) omit
- 29) 10.5 m/s^2 , downward
- 30) 0.255
- 31) $5.3 \times 10^4 \text{ N}$
- 32) $3.0 \times 10^2 \text{ N}$; No
- 33) a.) $1.0 \times 10^1 \text{ N}$
b.) 0.20
- 34) 1.2 m/s
- 35) 0.400
- 36) a) 1.17 m/s^2
b) -0.633 m/s^2
c) Stopping
d) As the elevator starts to descend a is negative and the scale reads less than 836 N . When constant downward velocity is reached, the scale reads 836 N because the acceleration is then zero. When the elevator

is slowing at the bottom, the acceleration is positive and the scale reads more than 836 N

37) a) 4.90×10^2 N

b) 147 N, static friction

c) 49 N, kinetic friction

d) 2.0×10^2 N

38) a) $+9.8 \text{ m/s}^2$ (up) ;

b) $+98.0 \text{ m/s}$ (up)

c) -49 N (down)

d) 10.0 s after release.

39) -2.0 m/s^2

40) a) $-6.0 \times 10^3 \text{ m/s}^2$

b) $-8.7 \times 10^2 \text{ N}$, in the opposite direction of the velocity of the ball

c) same magnitude, opposite direction (in direction of the velocity of the ball)

41) a,b) refer to problems and solutions manual.

c) 2.0 m/s^2 , up

42) 5.88 m/s^2 , downward