PHYS211, answers to some problems

**Homework 1**

#25: length = length + length

#26: (d)

#27: m2 = m2

#29: no; V = pd3/6

#47: 37,000,000 times

#49: (a) 91.5 m by 48.8 m

(b) 27.9 cm to 28.6 cm

#53: (a) (1) 1 m/s (b) 33.6 mi/h

#71: 5.05 cm; 5.05x10-1 dm; 5.05x10-2 m

#75: (b) and (d); (a) has four and (c) has six

#46: (b) and (d); (a) has four and(c) has six

#77: 32 ft2

**Homework 2**

#13: (a) 0.50 m/s, (b) 8.3 min

#15: 0.17 m/s

#19: (a) (3) between 40 m and 60 m,  
 (b) 45 m at 27o west of north

#21: (a) 2.7 cm/s, (b) 1.9 cm/s

#25: (a) – (b): 1 m/s – 1 m/s, 0 m/s – 0 m/s,  
 1.3 m/s – 1.3 m/s, -2.8 m/s – +2.8 m/s,   
 0 m/s – 0 m/s, 1 m/s – 1 m/s  
 (c) 1 m/s, 0 m/s, undefined, -2.8 m/s  
 (d) -0.89 m/s

#41: 6.9 m/s2

#51: (a): 0 m/s2, 2 m/s2, -4 m/s2, 8 m/s2,   
 0 m/s2; (b) moves at constant 4 m/s in  
 the negative x-direction

#54: (c)

#65: (a) 81.4 km/h (b) 0.794 s

#71: 2.2x105 m/s2

#75: (a) A = vot + (1/2)at2 (b) 96 m

#97: 67 m

**Homework 3**

#4: no, no

#7: (a) (1) greater than (b) 28 m/s, 21 m/s

#6: zero, #10: (a) 6.0 m/s (b) 3.6 m/s

#13: x = 1.75 m, y = -1.75 m

#17: (a) θ = 56.3˚ below horizontal

#30: 21 v at 51˚ below x-axis, 18.0 m/s

#31: 4.9 m, 59o above –x-axis

#41: 21 m/s at 51o below the +x-axis

#61: (a) 0.64 s, (b) 0.64 m

#63: 6.4 m

#69: (a) 0.77 m, (b) ball would fall behind the cannon.

#95: 6.7 s

**Homework 4**

#3: (c)

#15: 0.64 m/s

#16: (a) 2.0 kg: 20 N; 6.0 kg: 59 N (b) 9.80 m/s2

#19: (a) (3) either, (b) yes, 5.0 N at 20˚ below x-axis

#24: (c)

#37: (a) (4) one fourth as great (b) 4.0 m/s2

#38: (a) (1) less than, (b) 98 N and 85 N

#41: (a) 30 N (b) -4.6 m/s2

#48 (c)

#61: (a) (1) less than (b) 98 N and 85 N

#67: (a) 0.96 m/s2 (b) 2.6x102 N

#97: 2.7x102 N

#99: θmin = tan-1 0.65 = 33o > 20o, so it will not move

#101: 0.064

#107 (a) 6.0 kg, (b) 1.2 m/ s2

**Homework 5**

#6: zero, θ = 90o, so cosθ = 0

#9: –98 J

#17: (a) (2) one, (b) –62.5 J

#23: no, it takes more than twice the work, force increases as spring stretches

#25: k = 80 N/m

#27: 1.25x105 N/m

#33: (a) 4.5 J (b) 3.5 J

#47: (a) 45 J (b) 21 m/s

#51: 2.0x103 m

#59: (a) (4) only if the difference between the two heights, (b) position is lowered

0.51 m

#72: (a) 15.0 J, zero, 15.0 J (b) 7.65 J, 7.35 J, 15.0 J (c) zero, 15.0 J, 15.0 J

#81: (a) 11 m/s (b) no (c) 7.7 m/s

**Homework 6**

#9: (a) 85 kg∙m/s (b) 3.0x104 kg∙m/s

#13: 4.05 kg·m/s in direction opposite to vo

#17: ∆**P** = (-3.0 kg∙m/s)**y**

#23: (a) 10.6 kg·m/s in direction opposite vo   
(b) 2.26 x 103 N

#33: 6.0 x 103 N

#34: 13 m/s

#42: (a) 77 N·s, (b) 5.5x102 N, (c) 32 m/s

#55: moves at 0.083 m/s in opposite direction

#62: (a) 11 m/s to the right (b) 22 m/s to the right (c) at rest

#68: (a) no (b) 4.5 m/s

**Homework 7**

#28: 0.087 rad/s

#31: particle B

#33: (a) 0.84 rad/s (b) 3.4 m/s, 4.2 m/s

#47: 1.3 m/s

#49: 2.69x10-3 m/s2

#53: weight is supplying centripetal force (b) 3.1 m/s

#67: 1.1x10-3 rad/s2

#69 (a) both (b) 53 s (c) 8.6 m/s2

#83: 8.0x10-10 N, toward opposite corner

#85: 3.4x105 m

**Chapter 8**

#25: 5.6x102 N

#29: (a) yes (b) 2.3 m

#37: 0, 9.80 m∙N, 17.0 m∙N, 19.6 m∙N

#59: 6.4 m∙N

#62: 1.5x105 m∙N

#65: 1.2 m/s2

#69: (a) 1.5 g (b) 67-cm position

#81: (a) 28 J (b) 14 W

#89: cylinder goes higher by 7.1%

#93: (a) 33% (b) 40% (c) 50%

#105: 1.4 rad/s

#108: (a) 2 (less than) (b) 200 rpm

#111: (a) 4.3 rad/s (b) K = 1.1Ko (c) work done by the skater

**Homework 9**

#22: (a) (1) a higher, (b) 22 cm

#39: 6.39x10-4 m2

#45: 0.51 N

#67: 2.6 x 103 kg

#69: no

**Homework 10**

#13: 56.7oC and -62oC

#33: (a) (2) decrease, (b) 167oC

#35: 1.7 x 1023

#39: 0.16 L

#79: (a) 6.21x10-21 J (b) 1.37x103 m/s

#94: 8.3x103 J

**Homework 11**

#15: (a) (1) more heat (b) copper requires 2.1x104 J more

#18: 35.6oC

#21: 84oC

#41: 2.5x106 J and 2.5x105 J; yes

#43: 1.2 x 106 J