WileyPLUS Assignment 5

Chapters 11, 12, 14
Due Wednesday, December 9 at 11 pm

PHYS 1020 Final Exam

Friday, December 18, 1:30 - 4:30 pm
The whole course, 30 multiple choice questions
Formula sheet provided

Seating:

Frank Kennedy Brown Gym: A - S
Frank Kennedy Gold Gym: T - Z

Monday next week

Review of the course - send problems!

Wednesday next week

Available in office to answer problems

Office hours as usual until exam

Q4, 2007 Final: A tennis ball is shot vertically upward from the surface of an atmosphere-free planet with an initial speed of 20 m/s. Two seconds later, the ball has an instantaneous velocity in the upward direction of 10 m/s.

What is the greatest height the ball reaches?

Q26, 2008 Final: A piece of aluminum of mass 1 kg and density 2700 kg/m^3 is suspended from a string. If the aluminum piece is completely immersed in water (density 1000 kg/m^3), calculate the ratio of the tension in the string before and after the immersion in water.

Q30, 2008 Final: At what rate is heat lost through a 1 m x 1.5 m rectangular glass window pane that is 0.5 cm thick when the inside temperature is 20^0C and the outside temperature is 5^0C?

Thermal conductivity for glass is 0.8 $W/(m.C^0)$

Q28, 2008 Final: A thermos bottle contains 3 kg of water and 2 kg of ice in thermal equilibrium at 0^0C.

How much heat is required to bring the system to thermal equilibrium at 50^0C?

Specific heat of ice = 2000 $J/(kg.C^0)$
Latent heat of fusion of water = $33.5x10^4$ J/kg
Specific heat of water = 4186 $J/(kg.C^0)$

Q24, 2008 Final: A glass is filled with water. The pressure at the top of the glass is zero and the pressure at the bottom is P.

A second glass have three times the height and twice the diameter is also filled with water.

What is the pressure at the bottom of the second glass?

Q22, 2008 Final: A 3.2 kg block is hanging stationary from the end of a vertical spring attached to the ceiling. The elastic potential energy of this spring/mass system is 1.8 J.

What is the elastic potential energy of the system when the 3.2 kg block is replaced by a 5 kg block?

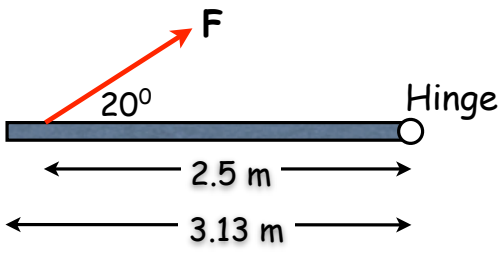
Q20, 2008 Final: As seen from above, a playground carousel is rotating counterclockwise about its centre on frictionless bearings. A person standing still on the ground grabs onto one of the bars on the carousel very close to its outer edge and climbs aboard.

The carousel has a radius of 1.5 m, an initial angular speed of 3.14 rad/s, and a moment of intertia of 125 kg.m^2. The mass of the person is 40 kg.

Find the final angular speed of the carousel after the person climbs aboard.

Q18, 2008 Final: A horizontally-oriented and uniform door weighs 145 N. The door is hinged on the right and can swing up and down in the vertical direction. A rope is tied to the handle of the door and a force, **F**, is applied along the rope.

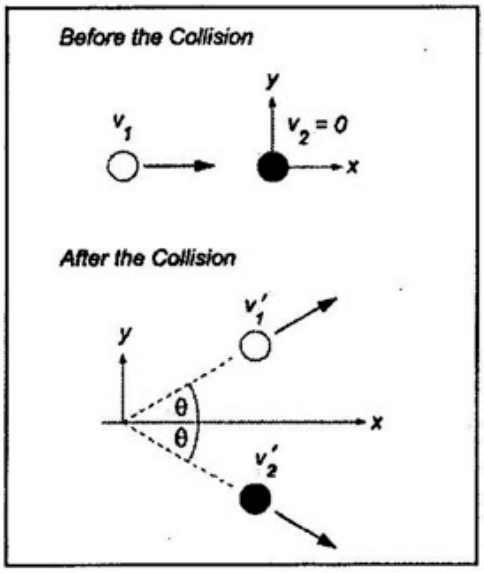
What is the magnitude of the force required to keep the door at rest?



Q16, 2008 Final:

Two billiard balls of equal mass, m, undergo an elastic collision. Before the collision, the white billiard ball travels in the x direction with a speed of 2.0 m/s and the black billiard ball is at rest. After the collision, the white ball travels in the θ direction above the x axis with speed v_1', while the black ball travels in the θ direction below the x axis with speed v_2', as shown in the figure. The angle θ is

(a) 23°
(b) 30°
(c) 37°
(d) 45°
(e) 52°



Q14, 2008 Final: A 17 kg child starts to slide from rest at the top of a 2 m high slide. Her speed at the bottom of the slide is 4.2 m/s.

How much work is done on the child by the force of friction between her and the slide?

Q12, 2008 Final: A 0.75 kg ball is attached to a 1 m rope and whirled in a vertical circle. The rope will break when the tension exceeds 450 N.

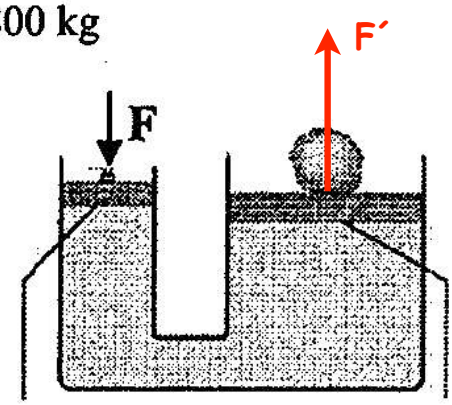
What is the maximum speed the ball can have at the bottom of the circle without breaking the rope?

Q10, 2008 Final: A 0.25 kg ball attached to a string is rotating in a horizontal circle of radius 0.5 m. If the ball revolves twice every second, what is the tension in the string?

Q29, 2008 Final:

A force of 250 N is applied to a hydraulic jack piston that is 0.010 m in diameter. If the piston which supports the load has a diameter 0.10 m, approximately how much mass can be lifted by the piston? Ignore any difference in height between pistons.

(a) 255 kg (b) 500 kg (c) 800 kg
(d) 2550 kg (e) 6300 kg



Diameter = 0.010 m Diameter = 0.10 m