This print-out should have 13 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

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001 (part 1 of 2) 10.0 points

If a golf ball and a ping-pong ball both move with the same kinetic energy, which has the greater speed?

$K = \frac{1}{2}mv^2$

1. the ping-pong ball

2. The two balls have the same speed.

3. Cannot be determined

4. the golf ball

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002 (part 2 of 2) 10.0 points

In a gaseous mixture of massive molecules and light molecules with the same average KE, which have the greater speed?

$K = \frac{1}{2}mv^2$

1. They have the same speed.

2. the massive molecules

3. Cannot be determined

4. the light molecules

$K_f - K_i = -|f_k| \cdot |\Delta x|$

π ↓ same

0 → f_a Δx f_k

003 10.0 points

This question is typical on some driver's license exams: A car moving at 40 km/h skids 17 m with locked brakes.

How far will the car skid with locked brakes at 100 km/h? Answer in units of m.

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004 10.0 points

Two objects of same material are travelling near you. Object A is a 1.1 kg mass traveling 10.2 m/s; object B is a 2 kg mass traveling 5 m/s.

Which object would make you feel worse if you are hit by it?

$K = \frac{1}{2}mv^2$

1. the same

2. B

3. Unable to determine

4. A

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005 10.0 points

A car is moving at 66 miles per hour. The kinetic energy of that car is 5×10^5 J.

How much energy does the same car have when it moves at 97 miles per hour? Answer in units of J.

$K = \frac{1}{2}mv^2$

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006 10.0 points

The Joule and the kilowatt-hour are both units of energy. See section on "Power"

14.1 kW · h is equivalent to how many Joules? Answer in units of J. Sect 5.6 in B|

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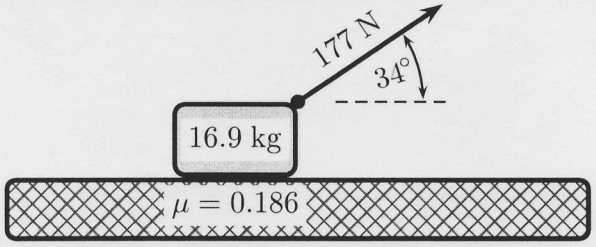
007 (part 1 of 5) 10.0 points

A 16.9 kg block is dragged over a rough, horizontal surface by a constant force of 177 N acting at an angle of angle 34° above the horizontal. The block is displaced 59.3 m, and the coefficient of kinetic friction is 0.186.

The acceleration of gravity is 9.8 m/s^2.



Find the work done by the 177 N force. Answer in units of J.

$W_F = |\vec{F}||\vec{d}|\cos\theta_{F,d}$

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008 (part 2 of 5) 10.0 points

Find the magnitude of the work done by the force of friction. Answer in units of J.

$W_{fk} = |\vec{f}_k||\vec{d}|\cos\theta_{fk,d}$

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009 (part 3 of 5) 10.0 points

What is the sign of the work done by the frictional force?

W_{fk} = angle between friction force & displacement?

$\cos\theta_{fk,d}$

1. negative

2. positive

3. zero

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010 (part 4 of 5) 10.0 points

Find the work done by the normal force. Answer in units of J.

Angle between normal force & displacement?

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011 (part 5 of 5) 10.0 points
What is the net work done on the block? Answer in units of J.

$W_{net} = \sum_i W_i$

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012 (part 1 of 2) 10.0 points
A force $\vec{F} = F_x\,\hat{\imath} + F_y\,\hat{\jmath}$ acts on a particle that undergoes a displacement of $\vec{s} = s_x\,\hat{\imath} + s_y\,\hat{\jmath}$.

Let: $F_x = 4$ N, $F_y = -5$ N, $s_x = 3$ m, and $s_y = 1$ m.

Find the work done by the force on the particle. Answer in units of J.

$W = \vec{F} \cdot \vec{d}$
$= |\vec{F}||\vec{d}| \cos\theta$
$= F_x d_x + F_y d_y$

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013 (part 2 of 2) 10.0 points
Find the angle between $\vec{F}$ and $\vec{s}$. Answer in units of °.

$\theta = \cos^{-1}\left(\dfrac{W}{|\vec{F}||\vec{d}|}\right)$

and some thoughts