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1. (1 point)
Student Name: Arfaz Hossain
Student ID: V00984826

A ball of mass $m = 4.71$kg has position as a function of time given by
$\vec{r}(t) = \left(5.39\frac{\text{m}}{\text{s}}t\right)\hat{\imath} + \left(1.17\frac{\text{m}}{\text{s}^2}t^2\right)\hat{\jmath} + \left(6.48\text{m}\cos(2.23\frac{1}{\text{s}}t)\right)\hat{k}$

(The input below will accept answers with no more than 1

What is the ball's kinetic energy at $t_1 = 2.27$s?

_____ J

What is the ball's kinetic energy at $t_2 = 3.49$s?

_____ J

What is the net work done on the ball between t_1 and t_2?

_____ J

UVic Problem ID: 20241611324924130
Student Name: Arfaz Hossain
Student ID: V00984826

Answer(s) submitted:

- 568.8928
- 714.7432356
- 145.8504356

(correct)

Correct Answers:

- 568.893
- 714.743
- 145.850

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2. (1 point)
Student Name: Arfaz Hossain
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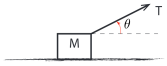
A box of mass $m = 33.3$kg is pulled by a rope over a rough surface as shown in the diagram below.



The box is subject to a pulling force $\vec{F}_{pull}$ of magnitude $T = 56.1$N which acts at an angle of $\theta = 15.5°$ above the horizontal.
The coefficient of kinetic friction between the box and the surface is $\mu_k = 0.085$.
The box is pulled a distance of 3.57m to the right as shown in the diagram, after starting at rest.

(The input below will accept answers with no more than 1

How much work did the pulling force do on the box?

_____ J

How much work did friction do on the box?

_____ J

What is the speed of the box after it has been pulled 3.57m to the right?

_____ $\frac{\text{m}}{\text{s}}$

UVic Problem ID: 20241611324924130
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Answer(s) submitted:

- 192.9930163
- -94.4785
- 2.4324444

(correct)

Correct Answers:

- 192.993
- -94.479
- 2.432

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3. (1 point)
Student Name: Arfaz Hossain
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Two masses $m_1 = 33.5$kg and $m_2 = 20.7$kg are moving on a horizontal frictionless surface as show. in the diagram.

The two masses are connected by a rope which is under tension T. The rope does not stretch, so the masses undergo the same acceleration.
m_1 is being pulled by a force $\vec{F} = F_0\hat{\imath} = 20.5\text{N}\hat{\imath}$.

(The input below will accept answers with no more than 1

How much work does the rope do on m_1 in a period where the masses are displaced by $3.47\text{m}\hat{\imath}$?

_____ J

UVic Problem ID: 20241611324924130
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Answer(s) submitted:

- -27.167

(correct)

Correct Answers:

- -27.168

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4. (1 point)
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A block is sliding along a rough horizontal surface.
The block's initial velocity is $\vec{v}_i = 21.06\frac{\text{m}}{\text{s}}\hat{\jmath}$.
The block undergoes a displacement $\Delta\vec{r} = 75.1\text{m}\hat{\jmath}$, and after that has happened its velocity is $\vec{v}_f = 6.30\frac{\text{m}}{\text{s}}\hat{\jmath}$.
The block has a mass $m = 67$kg.

(The input below will accept answers with no more than 1

What is coefficient of kinetic friction between the block and the surface?

_____ Nm

UVic Problem ID: 20241611324924130

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Student ID: V00984826

Answer(s) submitted:

- 0.274164893

(correct)

Correct Answers:

- 0.274

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5. (1 point)

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Student ID: V00984826

A block of mass $m = 4.57$kg moves along the x-axis subject to a net force which depends on position.

The force is $\vec{F}_{net}(x) = \left(-3.95\frac{\text{N}}{\text{m}}x - 2.32\frac{\text{N}}{\text{m}^3}x^3\right)\hat{\imath}$.

The block is initially at $x = 0$m moving with velocity $\vec{v} = -4.08\frac{\text{m}}{\text{s}}\hat{\imath}$.

(The input below will accept answers with no more than 1

What is the smallest value of x the block reaches?

_____ m

Hint: Calculate the work done as a function of x, and then solve the resulting quadratic expression for x^2.

What is the block's speed when it reaches $x = 1.30$m?

_____ $\frac{\text{m}}{\text{s}}$

UVic Problem ID: 20241611324924130

Student Name: Arfaz Hossain
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Answer(s) submitted:

- -2.57
- 3.805

(correct)

Correct Answers:

- -2.564
- 3.803