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

A particle of mass $m_1 = 5.51$kg initially travels with velocity $\vec{v}_{1,i} = 26.4\frac{m}{s}\hat{i}$.
A second particle of mass $m_2 = 7.69$kg initially travels with velocity $\vec{v}_{2,i} = 11.1\frac{m}{s}\hat{j}$.
The two particles collide; their interaction takes $t = 2.71$s.
After the collision $m_1$ travels with velocity $\vec{v}_{1,f} = 13.3\frac{m}{s}\hat{j}$.

(The input below will accept answers with no more than 1
How fast is $m_2$ moving after the collision?

_____ $\frac{m}{s}$

What was the magnitude of the average force on $m_2$ during the collision?

_____ N

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*Correct Answers:*

- 18.981
- 60.104

**2.** (1 point)
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A lump of clay of mass $m_1 = 5.47$kg is suspended against gravity by a light rope of length $\ell = 4.27$m.
A second lump of clay of mass $m_2 = 0.70$kg is shot at the first lump.
Immediately before they collide $m_1$ is stationary, hanging straight down, and $m_2$ is travelling horizontally at speed $|\vec{v}| = 32\frac{m}{s}$.
The lumps of clay stick together and swing on the rope.

(The input below will accept answers with no more than 1
How fast does the combined clay lump move immediately after the collision?

_____ $\frac{m}{s}$

What is the tension in the rope immediately after the collision?

_____ N

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*Correct Answers:*

- 3.630
- 79.511

**3.** (1 point)
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A particle of mass $m = 6.44$kg is initially travelling at $\vec{v} = 24.1\frac{m}{s}\hat{i} - 25.1\frac{m}{s}\hat{j}$.
The particle is then subject to a constant force $\vec{F} = 8.99$N$\hat{i} + 8.17$N$\hat{j}$ which acts for exactly 2.23s.

(The input below will accept answers with no more than 1
After the constant force has acted what is the particle's momentum?

$\vec{p} = $ _____ kg$\frac{m}{s}\hat{i} + $ _____ kg$\frac{m}{s}\hat{j}$

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*Correct Answers:*

- 175.252
- -143.425

**4.** (1 point)
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A lump of clay of mass $m_1 = 6.23$kg initially travels with velocity $\vec{v}_1 = 23.3\frac{m}{s}\hat{i} + 9.4\frac{m}{s}\hat{j}$.
The lump of clay $m_1$ collides with a second lump of clay of mass $m_2 = 3.35$kg which was travelling with an unknown velocity $\vec{v}_2$.
After the collision the combined lump travels with velocity $\vec{v}_f = -12.7\frac{m}{s}\hat{i} + 4.7\frac{m}{s}\hat{j}$.

(The input below will accept answers with no more than 1
What was $\vec{v}_2$?

$\vec{v}_2 = $ _____ $\frac{m}{s}\hat{i} + $ _____ $\frac{m}{s}\hat{j}$

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*Correct Answers:*

- -79.649
- -4.041

**5.** (1 point)
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Masses $m_1 = 2.67$kg and $m_2 = 6.07$kg are initially held at rest on a horizontal frictionless surface.
A massless spring of spring constant $k = 929\frac{N}{m}$ is compressed by some amount between them.
The masses are released, and the spring expands pushing them apart.

(The input below will accept answers with no more than 1
The final velocity of $m_1$ is $\vec{v}_1 = -23.96\frac{m}{s}\hat{i}$. What is the final velocity of $m_2$?

$\vec{v}_2 = $ _____ $\frac{m}{s}\hat{i}$

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Student ID: V00984826

*Correct Answers:*

- 10.539