Physics 2305 18 February, 2000
Quiz 6—Form A

1. Joshua slides down a curved frictionless ramp and skids across a smooth floor 3.3 m before stopping. If the top of the ramp is 2.2 m above the floor and he started at rest, what is the coefficient of kinetic friction between him and the floor?

A) 0.0
B) 0.33
C) 0.67
D) 1.5

2. A spring gun, when compressed 5.5 cm, fires a 1.4 kg water balloon with a velocity of 2.5 m/s. What is the spring constant?

A) 0.29 N/m
B) 64 N/m
C) 128 N/m
D) 2900 N/m

Useful constants and equations:

$U_g = m\ g\ h$ $\quad K = (\tfrac{1}{2})\ m\ v^2$ $\quad F_g = m\ g$

$U_e = (\tfrac{1}{2})\ k\ x^2$ $\quad F_e = -\ k\ x$

$g = 9.8\ \text{m/s}^2$ $\quad W = \int \mathbf{F}(\text{x}) \cdot d\mathbf{x}$ $\quad f = \mu\ N$

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Quiz 6—Form B

A cannonball of mass 4.4 kg falls from a height of 10 m onto a vertical spring with a spring constant of 180,000 N/m.

1. What is the velocity of the cannonball when it hits the spring?

A) 9.9 m/s
B) 14 m/s
C) 29 m/s
D) 196 m/s

2. Ignoring any change in gravitational potential energy, what is the maximum compression of the spring?

A) 4.8 mm
B) 3.5 cm
C) 4.9 cm
D) 6.9 cm

Useful constants and equations:

$U_g = m\ g\ h$ $\quad K = (\tfrac{1}{2})\ m\ v^2$ $\quad F_g = m\ g$

$U_e = (\tfrac{1}{2})\ k\ x^2$ $\quad F_e = -\ k\ x$

$g = 9.8\ \text{m/s}^2$ $\quad W = \int \mathbf{F}(x) \cdot d\mathbf{x}$ $\quad f = \mu\ N$

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Quiz 6—Form C

1. A 2.0 kg mass slides horizontally with a velocity of 2.0 m/s into a spring. If the spring compresses a maximum of 5.0 cm, what is the spring constant?

A) 0.32 N/m
B) 2.0 N/m
C) 1600 N/m
D) 3200 N/m

2. Henrietta the hamster slides down a frictionless inclined plane from a height of 0.60 m onto a flat surface where $\mu_k = 0.50$. How far does she slide horizontally before stopping?

A) 0.3 m
B) 0.4 m
C) 1.2 m
D) 1.5 m

Useful constants and equations:

$U_g = m\ g\ h$ $\quad K = (\tfrac{1}{2})\ m\ v^2$ $\quad F_g = m\ g$

$U_e = (\tfrac{1}{2})\ k\ x^2$ $\quad F_e = -\ k\ x$

$g = 9.8\ \text{m/s}^2$ $\quad W = \int \mathbf{F}(x) \cdot d\mathbf{x}$ $\quad f = \mu\ N$