FIRST MIDTERM

Name (print) ____________________________ Name (signed) __________________________

Discussion Instructor (circle one): Baselgia  Morrill  Reeve  Stoops  Zhang

Discussion Section # __________________

REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!

Use the conversion constants and data given on the front page.

(a) Convert 1652 m to feet.

\[
\text{Since } 1\text{ m} = 3.28\text{ ft} \quad \left(1652\text{ m}\right) \left(\frac{3.28\text{ ft}}{1\text{ m}}\right) = 5.42 \times 10^3 \text{ ft}
\]

(b) Convert 356 m/s to ft/s.

\[
\text{Since } 1\text{ m/s} = 3.28\text{ ft/s} \quad \left(356\text{ m/s}\right) \left(\frac{3.28\text{ ft/s}}{1\text{ m/s}}\right) = 1.17 \times 10^3 \text{ ft/s}
\]

(c) On a small planet a stone is dropped. After falling 13.0 m it has a speed of 9.80 m/s. Find the value of \( g \) on this planet.

\[
\begin{align*}
V_f^2 &= V_o^2 + 2a(x_f-x_i) \\
9.80^2 &= 0 + 2a(13.0) \\
a &= \frac{9.80^2}{2(13.0)} = 3.69 \text{ m/s}^2
\end{align*}
\]

(d) On the moon, how much time elapses for a dropped object to acquire a downward velocity of 33.0 m/s?

\[
\begin{align*}
V_f &= V_o + at \\
t &= \frac{V_f - V_o}{a} \\
0 &= 0 + at \\
V_f &= 33.0 \text{ m/s} \\
t &= \frac{33.0}{3.67} = 9.8 \text{ sec}
\end{align*}
\]

\[
g = 1.67 \text{ m/s}^2
\]

(e) On the moon an object dropped from a cliff lands in 135 s. How high (in m) is the cliff?

\[
x_f - x_i = v_0 t + \frac{1}{2} a t^2
\]

\[
x_f - x_i = 0 \text{ (135 s)} - \frac{1}{2} (1.67 \text{ m/s}^2)(135 \text{ s})^2
\]

\[
V_0 = 0 \\
t = 135 \text{ sec} \\
g = -1.67 \text{ m/s}^2
\]

\[
x_f - x_i = 1.52 \times 10^4 \text{ m}
\]