Motion In One Dimension, Practice F

1. $\Delta y = -239\ \text{m}$
$v_i = 0\ \text{m/s}$
$a = -3.7\ \text{m/s}^2$

a. $v_f = \sqrt{v_i^2 + 2a\,\Delta y} = \sqrt{(0\ \text{m/s})^2 + (2)(-3.7\ \text{m/s}^2)(-239\ \text{m})}$

$v_f = \sqrt{1.8 \times 10^3\ \text{m}^2/\text{s}^2} = \pm 42\ \text{m/s}$

$v_f = \boxed{-42\ \text{m/s}}$

b. $\Delta t = \dfrac{v_f - v_i}{a} = \dfrac{-42\ \text{m/s} - 0\ \text{m/s}}{-3.7\ \text{m/s}^2} = \boxed{11\ \text{s}}$

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2. $\Delta y = -25.0\ \text{m}$
$v_i = 0\ \text{m/s}$
$a = -9.81\ \text{m/s}^2$

a. $v_f = \sqrt{v_i^2 + 2a\Delta y} = \sqrt{(0\ \text{m/s})^2 + (2)(-9.81\ \text{m/s}^2)(-25.0\ \text{m})}$

$v_f = \sqrt{4.90 \times 10^2\ \text{m}^2/\text{s}^2} = \boxed{-22.1\ \text{m/s}}$

b. $\Delta t = \dfrac{v_f - v_i}{a} = \dfrac{-22.1\ \text{m/s} - 0\ \text{m/s}}{-9.81\ \text{m/s}^2} = \boxed{2.25\ \text{s}}$

Givens *Solutions*

3. $v_i = +8.0\ \text{m/s}$
$a = -9.81\ \text{m/s}^2$
$\Delta y = 0\ \text{m}$

a. $v_f = \sqrt{v_i^2 + 2a\Delta y} = \sqrt{(8.0\ \text{m/s})^2 + (2)(-9.81\ \text{m/s}^2)(0\ \text{m})}$

$v_f = \sqrt{64\ \text{m}^2/\text{s}^2} = \pm 8.0\ \text{m/s} = \boxed{-8.0\ \text{m/s}}$

b. $\Delta t = \dfrac{v_f - v_i}{a} = \dfrac{-8.0\ \text{m/s} - 8.0\ \text{m/s}}{-9.81\ \text{m/s}^2} = \dfrac{-16.0\ \text{m/s}}{-9.81\ \text{m/s}^2} = \boxed{1.63\ \text{s}}$

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4. $v_i = +6.0\ \text{m/s}$
$v_f = +1.1\ \text{m/s}^2$
$a = -9.81\ \text{m/s}^2$

$\Delta y = \dfrac{v_f^2 - v_i^2}{2a} = \dfrac{(1.1\ \text{m/s})^2 - (6.0\ \text{m/s})^2}{(2)(-9.81\ \text{m/s}^2)}$

$\Delta y = \dfrac{1.2\ \text{m}^2/\text{s}^2 - 36\ \text{m}^2/\text{s}^2}{-19.6\ \text{m/s}^2} = \dfrac{-35\ \text{m}^2/\text{s}^2}{-19.6\ \text{m/s}^2} = \boxed{+1.8\ \text{m}}$