

AP Physics First Semester Exam Review Answers

Motion

1. (1) Moving positive direction and speeding up, (2) Maintain that speed, (3) Slows to a stop and turns around and speeds up in the other direction.

2. a. 53 m/s, b. 25 m/s, c. $v=6t^2-1$, d. $a=12t$

3. $t=1\text{ s} : x=21.7\text{ m } y=7.6\text{ m } v_x=21.7\text{ m/s } v_y=2.7\text{ m/s } a_x=0\text{ m/s}^2 a_y=-9.8\text{ m/s}^2$
 $t=2\text{ s} : x=43.4\text{ m } y=5.4\text{ m } v_x=21.7\text{ m/s } v_y=-7.1\text{ m/s } a_x=0\text{ m/s}^2 a_y=-9.8\text{ m/s}^2$
Top $t=1.28\text{ s} : x=27.7\text{ m } y=8.0\text{ m } v_x=21.7\text{ m/s } v_y=0\text{ m/s } a_x=0\text{ m/s}^2 a_y=-9.8\text{ m/s}^2$

4. a. 20.1 m/s b. $x = 70.1\text{ m}$ c. 52 m

Forces

1. $a = 1.23\text{ m/s}^2$ down, either speeding up going down or slowing as it moves up.

2. $a = 2.45\text{ m/s}^2$, $F_{AB} = 36.75\text{ N}$

3. $a = 4.05\text{ m/s}^2$

4. $F_{RP} = 908\text{ N}$

5. $F_{CP} = 1760\text{ N}$

Energy

1. a. $W = 300\text{ J}$ b. $v = 4.56\text{ m/s}$

2. a. $h = 62.3\text{ m}$ b. $W = -61500\text{ J}$

3. a. $x = 0.163\text{ m}$ b. $x = 0.99\text{ m}$

4. $F = -\left(6r + \frac{4}{r^2}\right)$

5. $d = 2.04\text{ m}$

Momentum

1. a. $x = 0.89\text{ m}$ b. $v = -1\text{ m/s}$ for each block c. $J = -20\text{ kg m/s}$

2. $v = 12.0\text{ m/s}$ @ 41.6° +y of -x

3. a. $v = 3\text{ m/s}$ b. Elastic