

Name: \_\_\_\_\_

Answer Key

Period: \_\_\_\_\_

## Practice Physics Final Exam - Standards 1-7

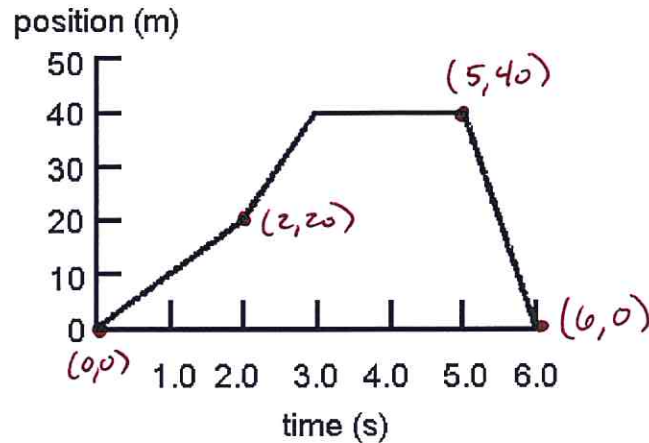


FIGURE 2-1

*slope of a line on a x vs. t graph*

- 1) In Fig. 2-1, what is the velocity at
- $t = 5.5$
- s?

A. 0  
B. 20 m/s  
C. -40 m/s  
D. 10 m/s

$$\text{slope} = \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{(0 - 40)}{(6 - 5)} = \frac{-40}{1} = -40 \text{ m/s}$$

1) C

- 2) In Fig. 2-1, what is the velocity at
- $t = 1.0$
- s?

F. 20 m/s  
G. 10 m/s  
H. 0  
J. -40 m/s

*slope of a line on a x vs. t graph*

$$\text{slope} = \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{(20 - 0)}{(2 - 0)} = \frac{20}{2} = 10 \text{ m/s}$$

2) G

- 3) If the position versus time graph of an object is a horizontal line, the object is

A. moving with constant non-zero acceleration.  
B. moving with infinite speed.  
C. moving with constant non-zero speed.  
D. at rest.

↑  
slope of line is zero so  
therefore the velocity is zero

3) D

- 4) How many meters is seventy kilometers? (1000 meters = 1 km)

F. 70,000 m  
G. 0.07 m  
H. 700,000 m  
J. 70 m

$$\frac{70 \text{ km}}{1 \text{ km}} \times 1000 \text{ m} = 70,000 \text{ m}$$

4) F

- 5) What must be your average speed in order to travel 350 km in 5.15 h?

A. 66.0 km/h  
B. 67.0 km/h  
C. 69.0 km/h  
D. 68.0 km/h

$$\begin{aligned} x_1 &= 0 \text{ km} & x_2 &= x_1 + v_1 t + \frac{1}{2} a t^2 \\ x_2 &= 350 \text{ km} & 350 &= 0 + v_1 (5.15) + \frac{1}{2} (0) (5.15)^2 \\ v_1 & & 350 &= v_1 (5.15) \\ v_2 & & \frac{350}{5.15} &= \frac{v_1 (5.15)}{5.15} \\ a &= 0 & & \\ t &= 5.15 \text{ h} & 67.96 &= v_1 \end{aligned}$$

$67.96 \text{ km/h} \approx 68 \text{ km/h}$

5) D

6) A new car manufacturer advertises that their car can go "from zero to sixty in 8 s". This is a description of

- F. instantaneous speed.
- G. average speed.
- H. instantaneous acceleration.
- J. average acceleration.

"Zero to sixty" represents a change in velocity over time (8 sec)  
 change in velocity over time = acceleration.

6) J

7) If you are 5'10" tall, what is your height in meters? (1 in = 2.54 cm.)

- A. 1.5 m
- B. 1.6 m
- C. 1.7 m
- D. 1.8 m

$$\frac{5 \text{ ft} \mid 12 \text{ in}}{1 \text{ ft}} = 60 \text{ in} + 10 \text{ in} = 70 \text{ in} \mid \frac{2.54 \text{ cm}}{1 \text{ in}} = 177.8 \text{ cm}$$

7) D

8) A rectangle is 3.25 m long and 1.5 m wide. What is its area?

- F. 4.87 m<sup>2</sup>
- G. 4.9 m<sup>2</sup>
- H. 4.875 m<sup>2</sup>
- J. 4.80 m<sup>2</sup>

area of rectangle =  $l \times w$   
 $= 3.25 \times 1.5$   
 $= 4.875 \text{ m}^2$

$$\frac{177.8 \text{ cm} \mid 1 \text{ m}}{100 \text{ cm}} = 1.778 \text{ m} \approx 1.8 \text{ m}$$

8) H

9) A car travels 90 km/h. How long does it take for it to travel 400 km?

- A. 4.1 h
- B. 4.2 h
- C. 4.4 h
- D. 4.3 h

$$x_1 = 0 \quad x_2 = x_1 + v_1 t + \frac{1}{2} a t^2$$

$$x_2 = 400 \text{ km} \quad 400 = 0 + 90(t) + \frac{1}{2}(0)t^2$$

$$v_1 = 90 \text{ km/h} \quad 400 = 90t$$

$$v_2 = 90 \text{ km/h} \quad 4.44 \text{ h} = t$$

$$a = 0 \text{ m/s}^2$$

$$t = ?$$

9) C

10) A polar bear starts at the North Pole. It travels 1.0 km south, then 1.0 km east, then 1.0 km north, then 1.0 km west to return to its starting point. This trip takes 45 min. What was the bear's average speed?

- F. 4.5 km/h
- G. 5.3 km/h
- H. 0.09 km/h
- J. 0 km/h

total distance = 4 km  
 total time = 45 min

$$\frac{45 \text{ min} \mid 1 \text{ hr}}{60 \text{ min}} = .75 \text{ h}$$

$$\bar{v} = \frac{d}{t} = \frac{4}{.75} = 5.33 \text{ km/h}$$

10) G

11) Suppose that an object is moving with a constant velocity. Make a statement concerning its acceleration.

- A. The acceleration must be equal to zero.
- B. The acceleration must be a constant non-zero value.
- C. The acceleration must be constantly increasing.
- D. The acceleration must be constantly decreasing.

means the velocity doesn't change so therefore there is no acceleration.

11) A

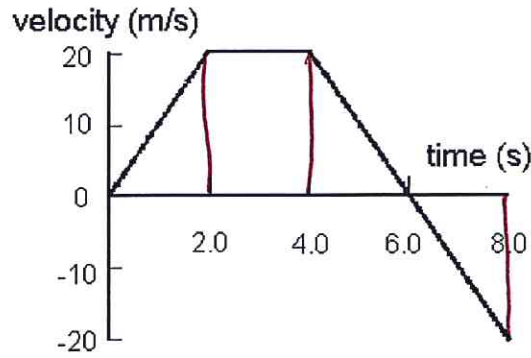


FIGURE 2-2

area under the curve of a  $v$  vs  $t$  graph.

12) In Fig. 2-2, what is the displacement from 0 to 8.0 s?

- F. 20 m
- G. 80 m
- H. 60 m
- J. 40 m

$$\begin{aligned} \Delta &= 20 \times 2 \times \frac{1}{2} = 20 & \nabla &= -20 \times 2 \times \frac{1}{2} = -20 \\ \square &= 20 \times 2 = 40 & & 20 + 40 + 20 + (-20) = 60 \text{ m} \\ \Delta &= 20 \times 2 \times \frac{1}{2} = 20 & & \end{aligned}$$

12) H  
60 m

13) A polar bear starts at the North Pole. It travels 1.0 km south, then 1.0 km east, then 1.0 km north, then 1.0 km west to return to its starting point. This trip takes 45 min. What was the bear's average velocity?

- A. 0.09 km/h
- B. 4.5 km/h
- C. 0 km/h
- D. 5.3 km/h

$$\begin{aligned} \text{total displacement} &= 0 \text{ km} \\ \text{total time} &= 45 \text{ min} \\ \frac{45 \text{ min}}{60 \text{ min}} &= .75 \text{ h} \\ \bar{v} &= \frac{\Delta x}{t} \\ \bar{v} &= \frac{0}{.75} = 0 \text{ km/h} \end{aligned}$$

13) C

14) An object moves 12.0 m north and then 7.0 m south. Find both the distance traveled and the magnitude of the displacement vector.

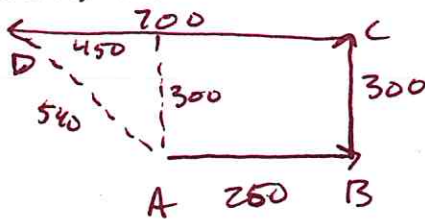
- F. 19.0 m, 5.0 m
- G. 5.0 m, 5.0 m
- H. 5.0 m, 19.0 m
- J. 19.0 m, 19.0 m



14) F

15) Starting from city A, a car drives 250 miles east to city B, then 300 miles north to city C, and finally 700 miles west to city D. What is the distance between city A and city D?

- A. 500 mi
- B. 300 mi
- C. 400 mi
- D. 600 mi



$$\begin{aligned} 300^2 + 450^2 &= C^2 \\ 540 \text{ mi.} &= C \end{aligned}$$



15) A

16. A car travels at a constant velocity of  $-5 \text{ m/s}$  for 35 seconds. It then comes to an instantaneous stop for 10 seconds. What is the final position of the car?

Express your final answer in meters. Show all of your work for full credit.

What do you know?	$X_1 = 0 \text{ m}$ $V_1 = -5 \text{ m/s}$ $a = 0 \text{ m/s}^2$ $X_2 = ?$ $V_2 = -5 \text{ m/s}$ $t = 35 \text{ sec}$
What formula?	$X_2 = X_1 + V_1 t + \frac{1}{2} a t^2$
Substitute in values	$X_2 = 0 + (-5)(35) + \frac{1}{2}(0)(35)^2$
Calculations	$X_2 = 0 + (-175) + 0$ $X_2 = -175 \text{ m}$
Answer	$X_2 = -175 \text{ m}$

17. Based on the situation above, sketch a representation of the car's total motion on a position vs. time graph and a velocity vs. time graph.

