Final Exam Practice – Physics

Name: KEY

Section 1 - Multiple Choice:

1. Subtract and chose the answer that has been rounded with the correct number of significant figures.

   40.80 - 14.0

   (A) 26
   (B) 27
   (C) 26.8
   (D) 27.0

2. Convert 162 meters to centimeters.

   (A) 0.162 cm
   (B) 1.62 cm
   (C) 16.2 cm
   (D) 1.62×10^4 cm

   $162\,m \times \frac{100\,cm}{1\,m} = 16200$

3. Which of the following is a vector quantity?

   (A) speed
   (B) time
   (C) displacement
   (D) distance

4. This type of error results from a piece of equipment that is not properly calibrated.

   (A) Parallax
   (B) Precision
   (C) Random
   (D) Systematic

5. A beginning runner walks for 3.0 km before jogging for 3.0 km. In the end, the runners GPS determined that the speed for the workout was 2.5 km/h. Which best describes the runner's speed as determined by the GPS?

   (A) Average
   (B) Constant
   (C) Instantaneous
   (D) Overall

6. Bob cycles from his home to 13 km [S] of his home. After he catches his breath he turns and cycles 11 km [N]. Calculate Bob's displacement with reference to his home.

   (A) 24 km [S]
   (B) 24 km [N]
   (C) 2 km [N]
   (D) 2 km [S]

   13 ↓ ↑ 11

7. Which of the following describes an object experiencing non-uniform motion?

   (A) It is accelerating.
   (B) It is traveling in a straight line at constant speed.
   (C) It is traveling at constant speed.
   (D) It is a satellite orbiting earth.

8. Calculate the displacement of an object with a constant velocity of 4.0 m/s [W] moving for a total of 7.0 s.

   (A) 28 m [W]
   (B) 4.0 m [W]
   (C) 1.8 m [W]
   (D) 0.57 m [W]

   $\vec{d} = \vec{v} \times t$
   $= 4.0 \times 7$
   $= 28\,m$

9. A ship travels 50.0 km [N] and then travels 30.0 km [S] in 4.00 h. What is its average velocity?

   (A) 5.00 km/h [N]
   (B) 5.00 km/h [S]
   (C) 20.0 km/h [N]
   (D) 20.0 km/h [S]

   50 ↑ ↓ 30

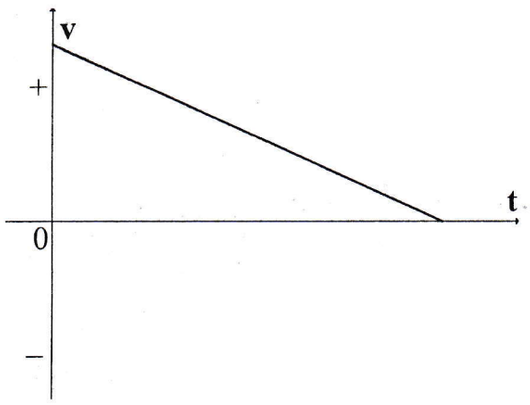
   $\vec{d} = 20\,km\,[N]$

   $\vec{v} = \frac{20}{4}$

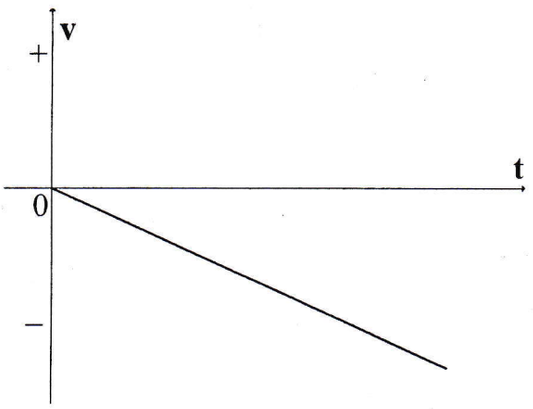
10. The slope of a velocity versus time graph gives:
    (A) distance
    (B) displacement
    (C) average speed
    (D) acceleration

11. Which graph below represents an object moving to the right and speeding up?

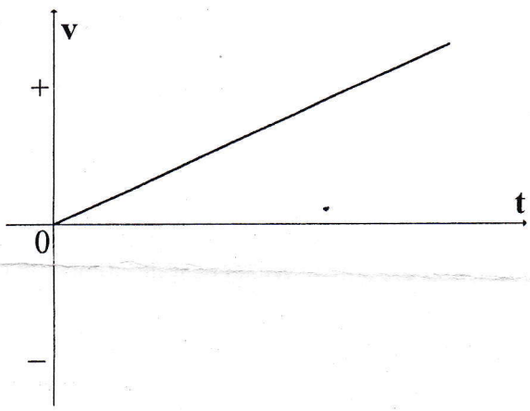
(A)



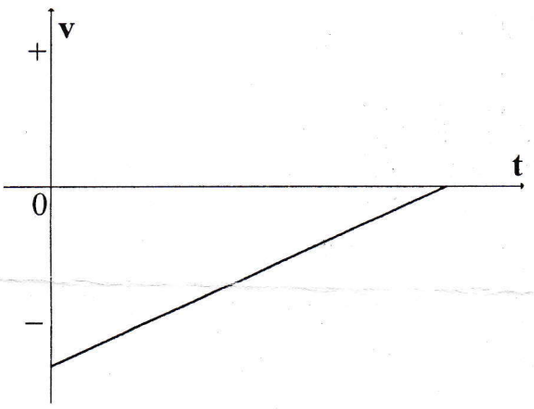
(B)



(C)



(D)



12. You are running down the road at a speed of 3.0 m/s when you see a dog. Frightened, you increase your speed to 7.5 m/s in 5.0 s. What is the magnitude of your acceleration?
    (A) 0.90 m/s^2
    (B) 2.1 m/s^2
    (C) 4.5 m/s^2
    (D) 6.9 m/s^2

$a = \frac{V_2 - V_1}{t} = \frac{7.5 - 3.0}{5} = \frac{4.5}{5} =$

13. Write 0.00623 in **scientific notation**.
    (A) 6.23×10^3
    (B) 62.3×10^2
    (C) 6.23×10^{-3}
    (D) 62.3×10^2

14. What is the speed of a bicycle which travels 200m in 0.83 min at a constant speed?
    (A) 4m/s
    (B) 2m/s
    (C) 2m/s^2
    (D) 5000m

$0.83 \text{ min} \times \frac{60 \text{ s}}{1 \text{ min}} = 49.8 \text{ s}$

$v = \frac{d}{t} = \frac{200 \text{ m}}{49.8 \text{ s}} = 4$

15. What does the area under a speed-time graph represent?
    (A) Distance
    (B) Displacement
    (C) Acceleration
    (D) Velocity

16. A cart is pushed from rest on a lab bench top and reaches a distance of 1.75 m in a time of 1.25 s. Assuming that the motion is uniform, what is the average speed in **cm/s**?

(A) 140
(B) 219
(C) 1.40
(D) 2.19

$v = \frac{d}{t} = \frac{1.75\,m}{1.25\,s}$

17. If an object's final velocity is 100 km/h and its rate of acceleration is 56.3 km/h² in 20 minutes, what is its initial velocity in km/h?

(A) 1026 km/h
(B) 324 km/h
(C) 81.2 km/h
(D) 67.1 km/h

$20\ min \times \frac{1\ h}{60\ min} = 0.33$

$v_1 = v_2 - at$
$= 100 - 56.3(0.33)$
$= 100 - 18.6 = 81.4$

18. A car is going down the road at a speed of 30Km/h. It then accelerates to a speed of 80km/h in a time of 6s. What is the cars acceleration?

(A) 400km/h/s
(B) 0.12km/h/s
(C) 8.3km/h/s
(D) 0.0009km/h/s

$a = \frac{80 - 30}{6}$
$= \frac{50}{6} = 8.3$

19. What is a motorcycle's acceleration if it starts from rest and increases speed to 16.0m/s in 2.50s?

(A) 40.0m/s²
(B) 6.40m/s²
(C) 4.00m/s²
(D) 13.5m/s²

$a = \frac{16 - 0}{2.5} = 6.4$

20. How long does it takes a car to increase speed from 20.0m/s to 38.0m/s if its acceleration is 3.00m/s²?

(A) 0.167s
(B) 6.00 s
(C) 19.3 s
(D) 54.0 s

$t = \frac{38.0 - 20}{3.00}$
$= \frac{18}{3} = 6$

Section II – Written Response

1. An object accelerates uniformly at 1.50 m/s² for 3.30 s. If the velocity of the object reaches 7.20 m/s at this time, what was the initial velocity? What was the initial velocity in km/h?

$a = 1.50\,m/s^2$
$t = 3.30\,s$
$v_1 = ?$
$v_2 = 7.20\,m/s$

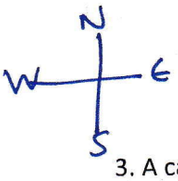
$v_1 = v_2 - at$
$= 7.20 - 1.50(3.30)$
$= 7.20 - 4.95$
$= 2.25\,m/s$

$2.25\,m/s \times 3.6$
$v_1 = 8.1\,km/h$

2. A horse accelerates from rest at 2.2 m/s². How many seconds would it take the horse to reach a top speed of 26 m/s? (2)

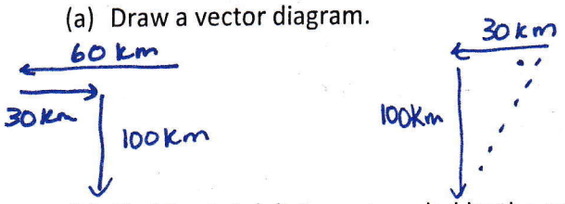
$a = 2.2\,m/s^2$
$v_1 = 0$
$v_2 = 26\,m/s$
$t = ?$

$t = \frac{v_2 - v_1}{a}$
$= \frac{26 - 0}{2.2}$
$t = 11.8\,s$



3. A car travels 60.0 km [W] in 1.0 hour, turns and drives back 30.0 km [E'] in 0.50 hour. The car stops for 2.0 hours and then drives 100.0 km [S] in 1.0 hour.

(a) Draw a vector diagram.



(b) Find the total distance traveled by the car.

$d = 60 + 30 + 100$

$d = 190$ km

(c) What is the average speed of the car?

$t = 1 + 0.5 + 2 + 1 = 4.5$

$v = \frac{d}{t} = \frac{190\text{km}}{4.5\text{h}} = 42.2$ Km/h

(d) What is the car's displacement?

$a^2 + b^2 = c^2$

$30^2 + 100^2 = c^2$

$900 + 10000 = c^2$

$c^2 = 10900$

$c = \sqrt{10900}$

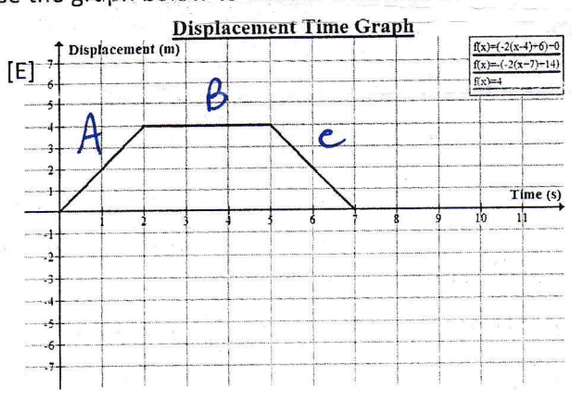
$c = 104.4$ Km

$\vec{d} = 104.4$ km [SW]

(e) What is the car's average velocity?

$\vec{v} = \frac{\vec{d}}{t} = \frac{104.4}{4.5} = 23.2$ Km/h [SW]

4. Use the graph below to answer that follow.



(a) Calculate the speed for segment A.

Slope $= \frac{4}{2} = 2$ m/s [E]

(b) Describe the motion for each of the lettered segments.

A: travelling east away from home at constant $\vec{v}$

B: stopped

C: travelling west, constant velocity to home.