Physics 2204
Unit 1 Test 1
2011-2012

Name:_____

Part I – MULTIPLE CHOICE: Circle the best answer. (30 marks, 1.5 mark each)

1. Which of the following is an example of uniform motion?

   (A) A ball is dropped out of a window
   (B) A football is thrown in the air and caught 30 m away
   (C) An elevator comes to a stop
   (D) A marble rolls on a flat table

2. What is defined as the rate of change of displacement?

   (A) acceleration (B) displacement
   (C) speed (D) velocity

3. Which statement includes an example of a vector quantity?

   (A) Juanita walks 2 km to get water.
   (B) Paradise lies 24 km west of St. John's.
   (C) The density of aluminum is 2,700 kg/m^3
   (D) A jogger runs 3 km around a track.

4. If Wayne is travelling at 6.0 m/s for 3.0 minutes, how far does Wayne travel?

   (A) 2.0 m (B) 18 m (C) 30.0 m (D) 1100 m

5. Canada geese can fly at 30.0 km/h. How long would it take to fly 1.0 km?

   (A) 0.033 min (B) 2.0 min (C) 30.0 h (D) 120 min

6. A car travels 90.0 meters due north in 15.0 seconds. Then the car turns around and travels 40.0 meters due south in 5.00 seconds. What is the magnitude of the **average velocity** of the car during this 20.0 second interval?

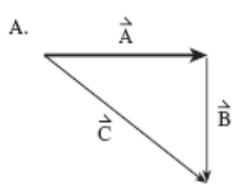
   (A) 2.5 m/s (B) 5.0 m/s (C) 6.5 m/s (D) 7.0 m/s

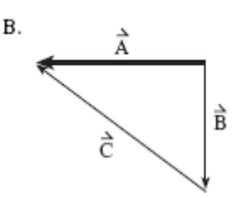
7. Vector 1 has a magnitude of 4.5 cm and vector 2 has a magnitude of 3.5 cm. If these vectors are added properly, which of the following cannot be the magnitude of the resultant vector?

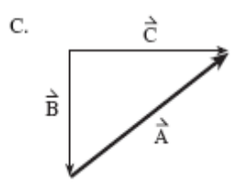
   (A) 1.0 cm (B) 5.2 cm (C) 8.0 cm (D) 9.0 cm

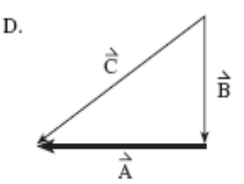
8. A cyclist rides a bicycle 4.0 km west, then 3.0 km north. What is the cyclist's displacement?
   (A) 5.0 km [37° NW] (B) 5.0 km [37° WN]
   (C) 7.0 km [37° WN] (D) 7.0 km [37° NW]

9. Which of the following vector diagrams shows $\vec{A}$ as the sum of $\vec{B}$ and $\vec{C}$ (i.e. $\vec{A} = \vec{B} + \vec{C}$)?

A.


B.


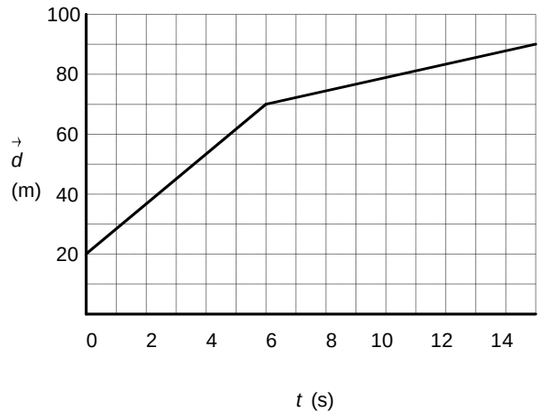
C.


D.


10. What is the opposite of the following vector: 20 km [N 30□ E]?

(A) 20 km [E 30° N] (B) 20 km [E 60° N]
(C) 20 km [S 30° W] (D) 20 km [S 60° W]

Use the Displacement-Time graph to the right to answer questions 11 through 12.



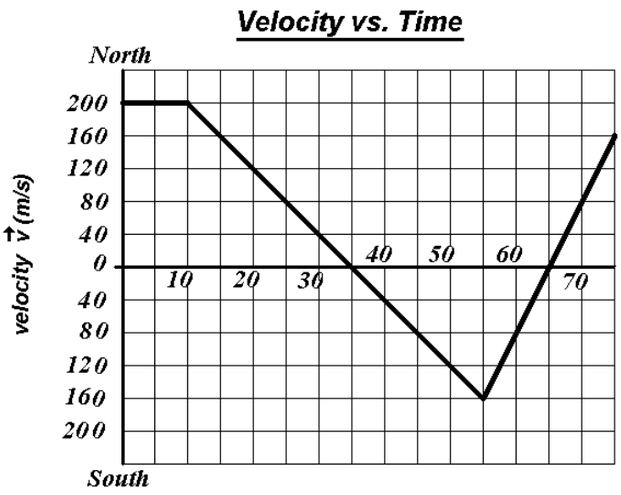
11. Given the position-time graph above, calculate the velocity of the object for the first 6.0 seconds.

(A) 3.3 m/s (B) 8.3 m/s (C) 12 m/s (D) 70 m/s

12. For the same graph above, what is the average velocity for the entire 15 seconds?

(A) 2.2 m/s (B) 4.7 m/s (C) 6.0 m/s (D) 7.8 m/s

Use the velocity-time graph to the right to answer questions 13 through 15.



13. During what time interval did the object speed up?

(A) 0 s to 10 s (B) 10 s to 35 s (C) 35 s to 55 s (D) 55 s to 65 s

14. During what time interval did the object slow down?

(A) 0 s to 10 s (B) 10 s to 55 s (C) 55 s to 65 s (D) 65 s to 75 s

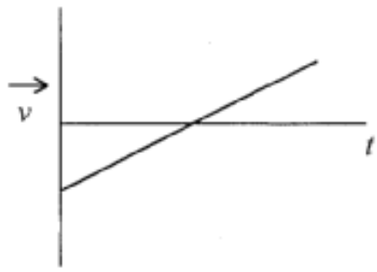
15. How much distance does the object travel in the first 35 s of motion ?

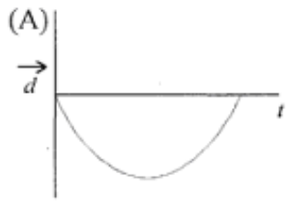
(A) 2000 m (B) 2500 m (C) 4500 m (D) 7000 m

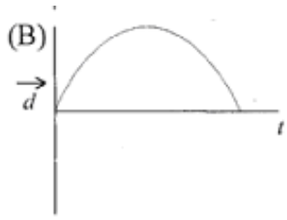
16. What is the object's acceleration at 35 s?

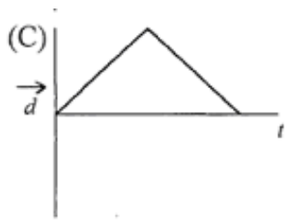
(A) - 8.0 m/s^2 (B) - 6.5 m/s^2 (C) -5.7 m/s^2 (D) 0 m/s^2

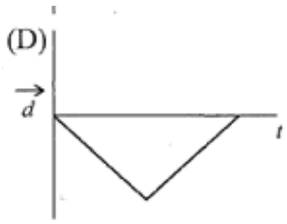
17. For the velocity-time graph shown at the right, which shows the correct displacement-time graph for the object's motion?







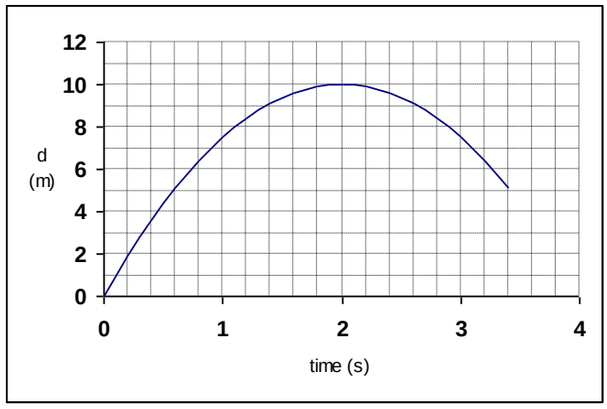




18. What is true for an object if it is travelling to the left and slowing down? Assume motion to the right is positive.

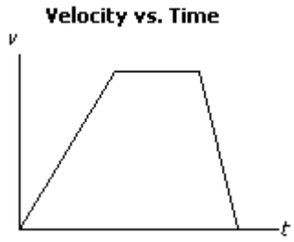
(A) It's velocity is positive and it's acceleration is positive
(B) It's velocity is positive and it's acceleration is negative
(C) It's velocity is negative and it's acceleration is negative
(D) It's velocity is negative and it's acceleration is positive

19. Which situation best describes the motion exhibited in the graph below?



(A) The object is speeding up in the positive direction.
(B) The object is slowing down in the positive direction.
(C) The object is slowing down in the positive direction, comes to a stop and then speeds up in the positive direction.
(D) The object is slowing down in the positive direction, comes to a stop and then speeds up in the negative direction.

20. Consider the following velocity-time graph and select the statement that is true.



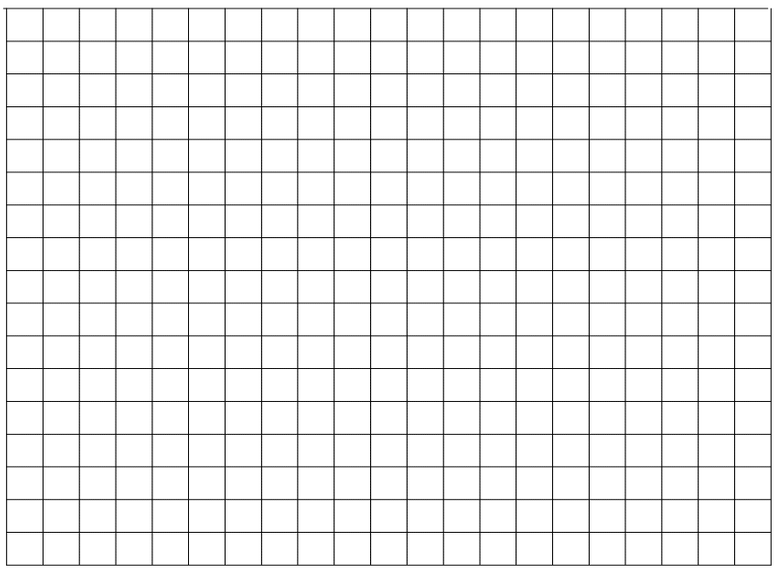
(A) The object travels in one direction and then the other.
(B) The object returns to its original position.
(C) The object is accelerating throughout the entire recorded time.
(D) The object speeds up and later slows down.

Long Answer: Answer all questions and show all working. Full marks will not be given without workings

21. A car travels 68 km/h [E] for 3.5 h and 78 km/h [W] for 2.0 h and then 45 km/h [E] for 1.5 hours. Find its average speed and average velocity. **{6 marks}**

2. A car travelling at 10.0 m/s passes a stopped truck. **Three seconds** after the car passes, the truck accelerates from rest at 5.00 m/s^2 until it reaches 15.0 m/s. Then, it continues at a constant speed of 15.0 m/s.

(A) Plot a velocity - time graph for the car and the truck on the grid. **{5 marks}**

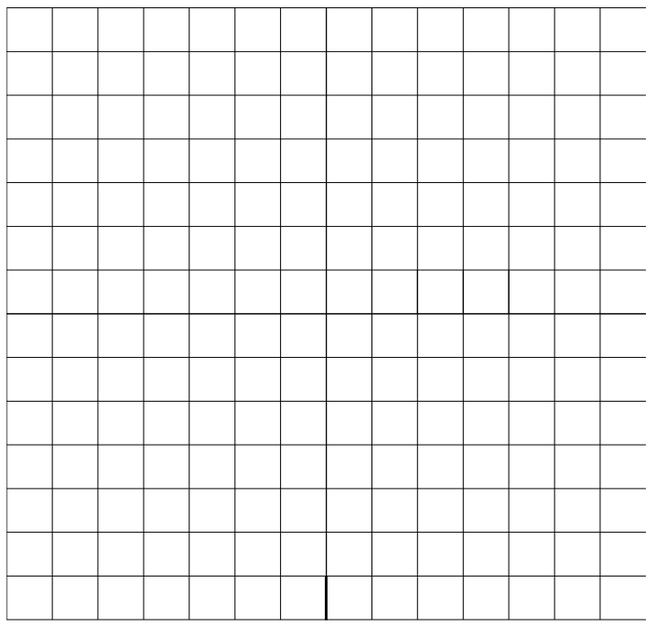


(B) When did the car and the truck have the same speed? **{1 mark**}

(C) When did truck catch the car? **{5 marks}**

3. Can an object be accelerating and still be travelling at a constant speed? Explain.
{2 marks}

4. Draw a position-time graph for a runner who moves at 4.0 m/s for 10 s, then at 1.5 m/s for 20 s, -2.5 m/s for 10 s, then - 5.0 m/s for 10 s. **{5 marks}**



5. Zack heads out on an expedition. He starts from his cabin, walks 6.50 km [N] then 8.10 km [E], and finally 2.20 km [S] in 3.50 h.

(a) Sketch Zack's motion and determine his average velocity. **{6 marks}**

(b) What is Zack's average speed? **{2 marks}**