

Physics 2204  
Test 1: Unit 1

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

Multiple Choice:      Circle the correct response. {24 marks}

1. Which is true of acceleration and speed?

	Acceleration	Speed
(A)	scalar	scalar
(B)	scalar	vector
(C)	vector	scalar
(D)	vector	vector

2. Which example illustrates uniform motion?

- (A) A ball rolls down a ramp.
- (B) A car slows down at a stop light.
- (C) A pendulum swings 5 times.
- (D) A puck slides along the ice.

3. Which statement is true?

- (A) Displacement can never be equal to distance.
- (B) Displacement can never be greater than distance.
- (C) Displacement can never be less than distance.
- (D) Displacement is always equal to distance.

4. If a physical quantity were defined as the rate of change of displacement, what is the SI unit for the quantity?

- (A) m                      (B) m/s                      (C) m/s<sup>2</sup>                      (D) m<sup>2</sup>/s

5. 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

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

- (A) .033 min                      (B) 2.0 min                      (D) 30.0 h                      (D) 120 min

7. A car travels 50.0 km in 45 min. What is its speed?

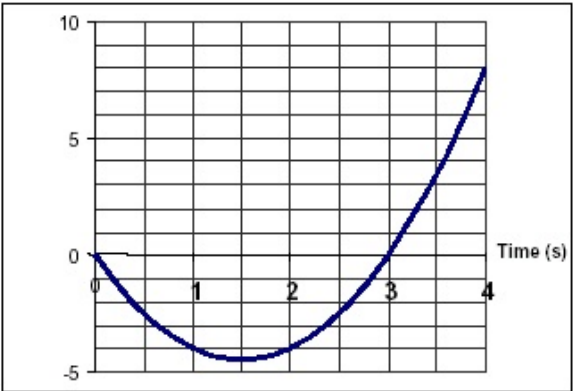
- (A) 0.90 km/h                      (B) 1.1 km/h                      (C) 38 km/h                      (D) 67 km/h

8. A car travels up a 1.0 km hill at a constant speed of 10.0 km/h and returned down the hill at a speed of 20.0 km/h. If the time needed to turn around is ignored, what was the total speed for the trip?

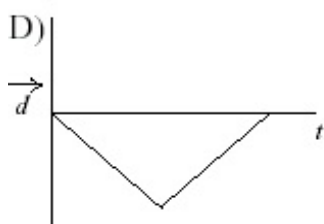
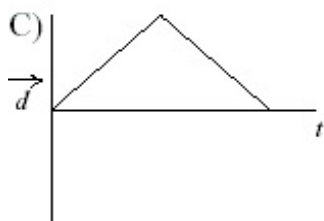
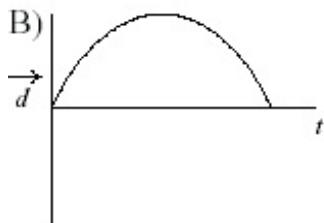
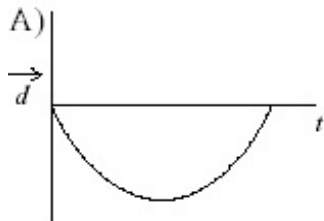
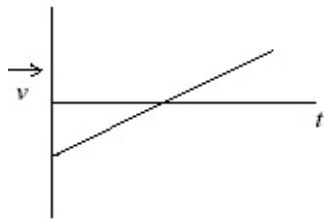
- (A) 0 km/h                      (B) 13.3 km/h                      (C) 15.0 km/h                      (D) 16.7 km/h

9. The graph at the right plots the displacement of an object vs. its time. In which time interval is the object slowing down and travelling to the left?

- (A)  $t = 0 \text{ s}$  to  $t = 1.0 \text{ s}$
- (B)  $t = 1.5 \text{ s}$
- (C)  $t = 2.0 \text{ s}$  to  $t = 3 \text{ s}$
- (D)  $t = 3 \text{ s}$  to  $t = 4 \text{ s}$

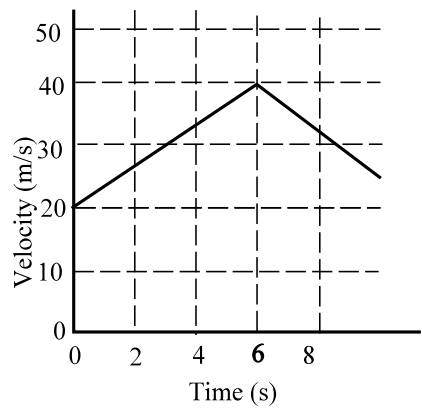


10. The velocity-time graph for an object travelling in a straight line is given. Which graph shows the correct position-time graph for the object's motion?



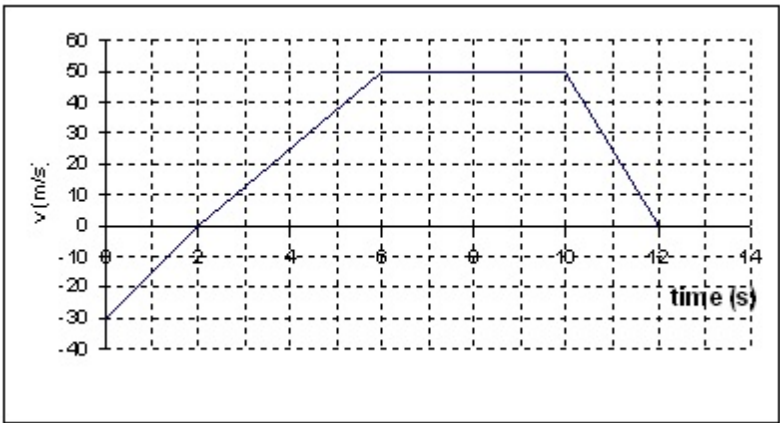
11. Examine the graph at the right. What is the acceleration at  $t = 3.0\text{ s}$ ?

- (A)  $3.3\text{ m/s}^2$
- (B)  $6.7\text{ m/s}^2$
- (C)  $10\text{ m/s}^2$
- (D)  $11.7\text{ m/s}^2$



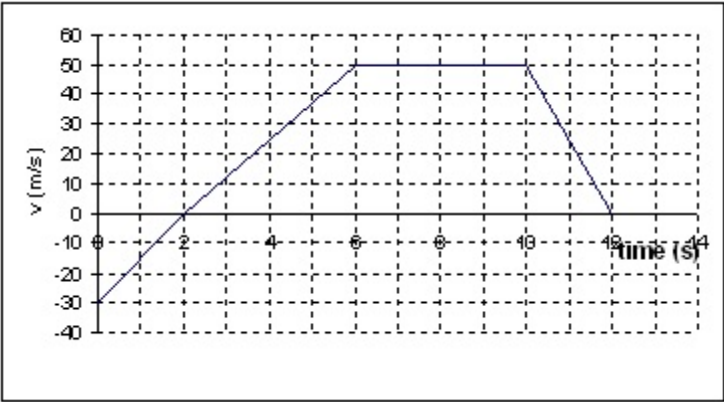
12. Examine the graph shown at the right. What is the net displacement at  $t = 12\text{ s}$ ?

- (A)  $0\text{ m}$
- (B)  $320\text{ m}$
- (C)  $350\text{ m}$
- (D)  $380\text{ m}$



13. If we assume that motion to the right is positive, then which of the following statements describes the motion of the object depicted in the graph from  $t = 10$  s to  $t = 12$  s?

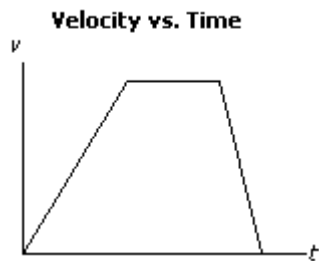
- (A) moving to the left and slowing down
- (B) moving to the left at speeding up
- (C) moving to the right and slowing down
- (D) moving to the right and speeding up



14. Which of the following statements concerning motion graphs is correct?

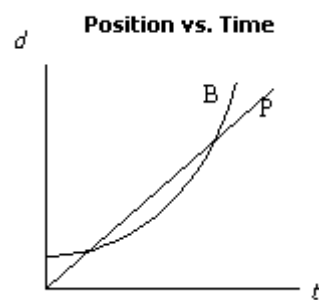
- (A) The area under a velocity-time graph gives instantaneous acceleration.
- (B) The area under a velocity-time graph gives displacement.
- (C) The area under a position-time graph gives velocity.
- (D) The slope of a velocity-time graph gives displacement.

15. 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.

16. The position-time graph pictured below depicts a person, P, running to catch a bus, B, that has just begun to pull away. Which of the following statements is true?



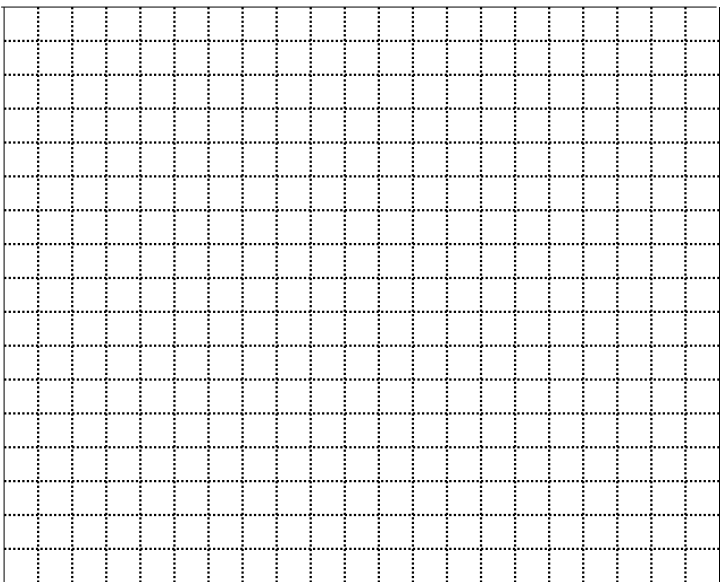
- (A) The person has no chance of catching the bus.
- (B) The person's acceleration is greater than that of the bus.
- (C) The person has two opportunities to catch up to the bus.
- (D) The speed of the bus is always greater than that of the person.

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

1. 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<sup>2</sup> until it reaches 15.0 m/s.

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

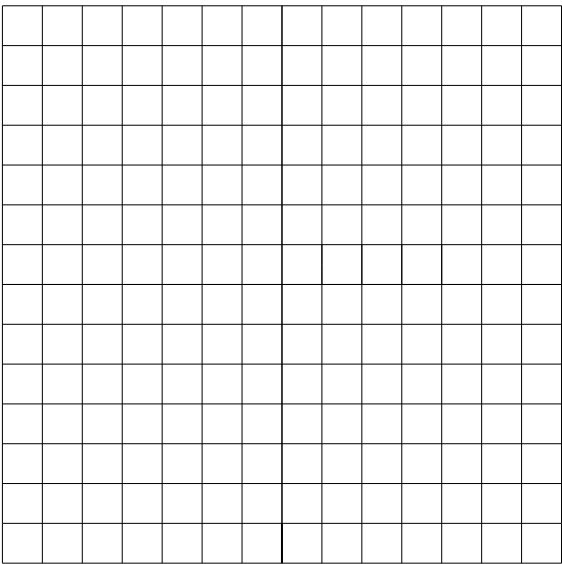


(B) When did the car and the truck have the same speed? **{1 mark}**

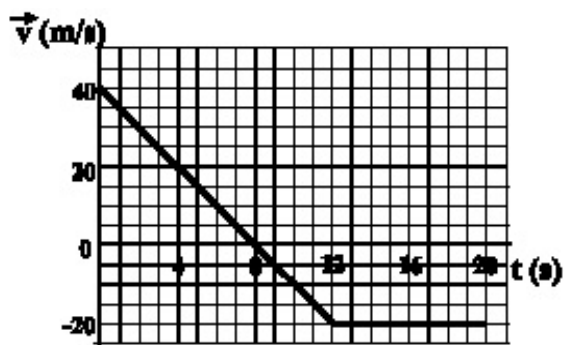
(C) When did truck catch the car? **{5 marks}**

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. The graph below represent an object’s motion for a 20 s time interval. **Positive denotes eastward.**



(A) Calculate the acceleration of the object at t = 6 s. {2 marks}

(B) Describe the motion of the object for the time interval t = 8.0 s to t = 16 s. {2 marks}