

Test of Understanding Graphs in Kinematics-v2

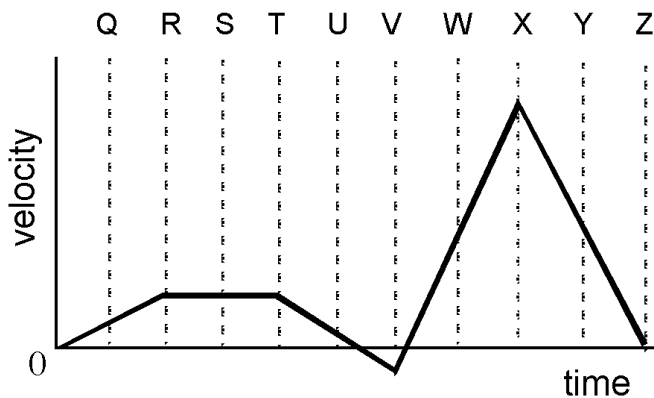
Instruction

Wait until you are told to begin, then turn to the next page and begin working. Answer each question as accurately as you can. There is only one correct answer for each item. Feel free to use a calculator and scratch paper if you wish. Use a #2 pencil to record your answers on the computer sheet, but please **do not write in the test booklet**. You will have approximately one hour to complete the test. If you finish early, check over your work before handing in both answer sheet and the test booklet.

based on the TUG-K by
©1994 by Robert J. Beichner
North Carolina State University
Department of Physics
Raleigh, NC 27695-8202
919-515-7226 or 2515
Beichner @ NCSU.edu

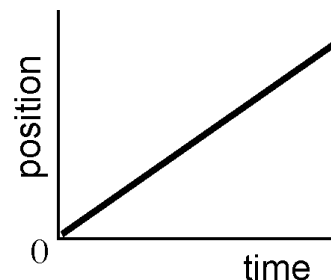
1. When is the acceleration the most negative?

- A) R to T
- B) T to V
- C) V
- D) X
- E) X to Z



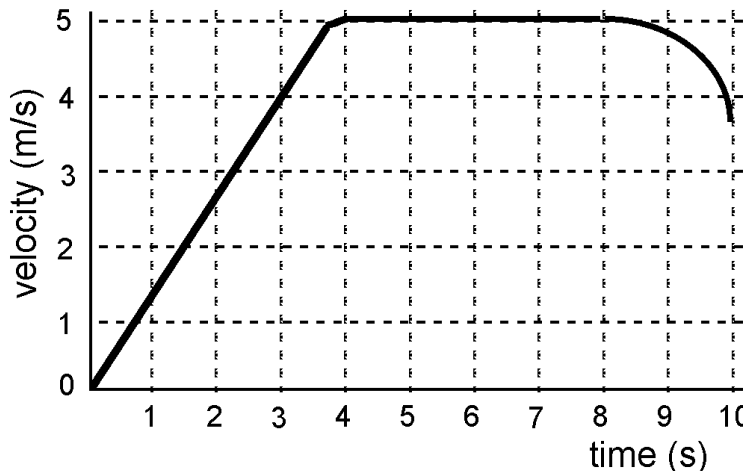
2. To the right is a graph of an object's motion. Which is the best interpretation?

- A) The object is moving with a constant, non-zero acceleration.
- B) The object does not move.
- C) The object is moving with a uniformly increasing velocity.
- D) The object is moving at a constant velocity.
- E) The object is moving with a uniformly increasing acceleration.



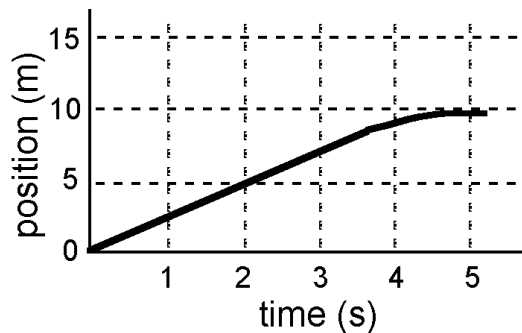
3. An elevator moves from the basement to the tenth floor of a building. The mass of the elevator is 1000 kg and it moves as shown in the velocity-time graph below. How far does it move during the first three seconds of motion?

- A) 0.75 m
- B) 1.33 m
- C) 4.0 m
- D) 6.0 m
- E) 12.0 m



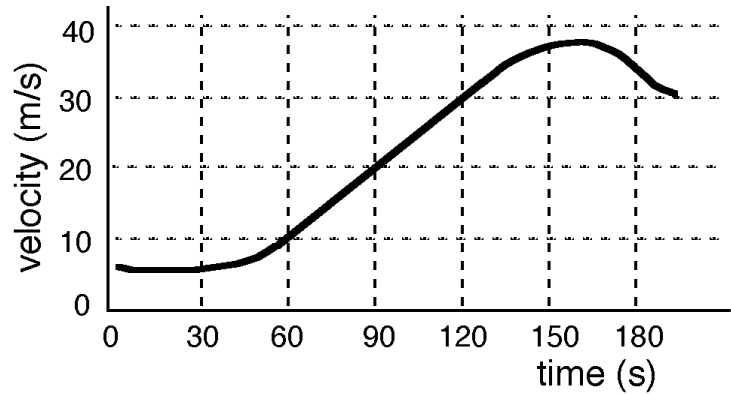
4. The velocity at the 2 second point is:

- A) 0.4 m/s
- B) 2.0 m/s
- C) 2.5 m/s
- D) 5.0 m/s
- E) 10.0 m/s

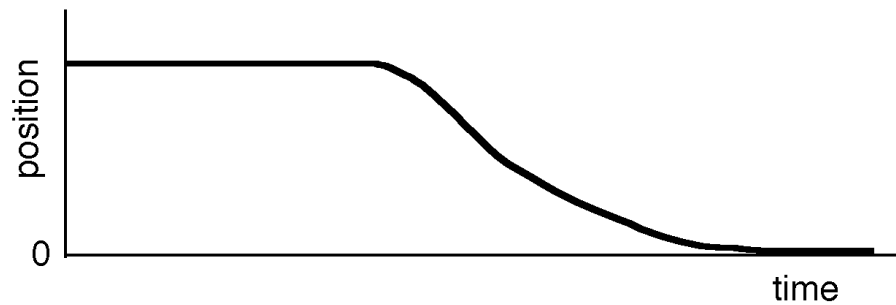


5. This graph shows velocity as a function of time for a car of mass 1500 kg. What was the acceleration at the 90 s mark?

- A) 0.22 m/s^2
 B) 0.33 m/s^2
 C) 1.0 m/s^2
 D) 9.8 m/s^2
 E) 20 m/s^2

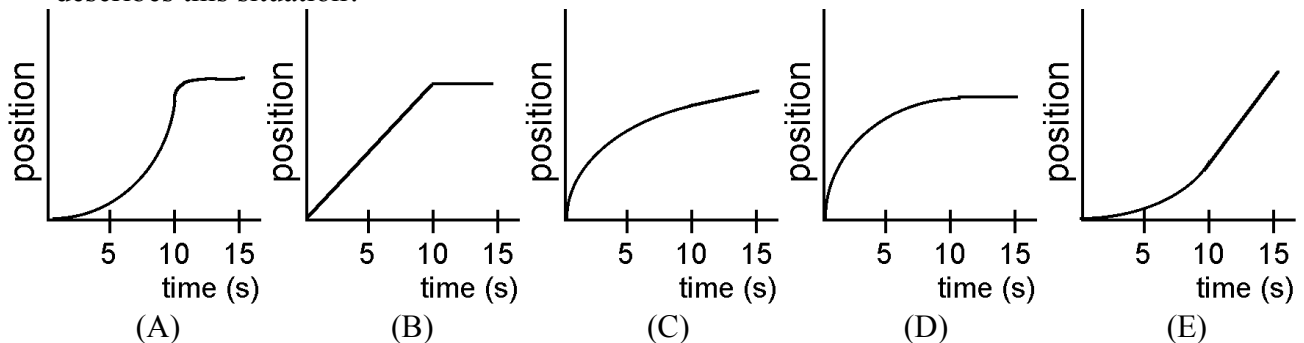


6. Here is a graph of an object's motion. Which sentence is a correct interpretation?

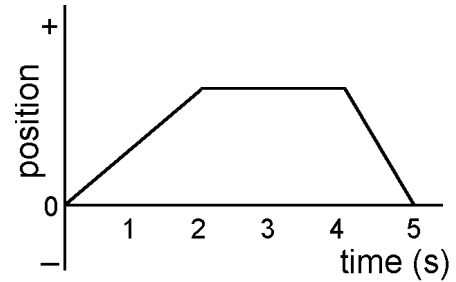


- A) The object rolls along a flat surface. Then it rolls forward down a hill, and then finally stops.
 B) The object doesn't move at first. Then it rolls forward down a hill and finally stops.
 C) The object is moving at a constant velocity. Then it slows down and stops.
 D) The object doesn't move at first. Then it moves backwards and then finally stops.
 E) The object moves along a flat area, moves backwards down a hill, and then it keeps moving.

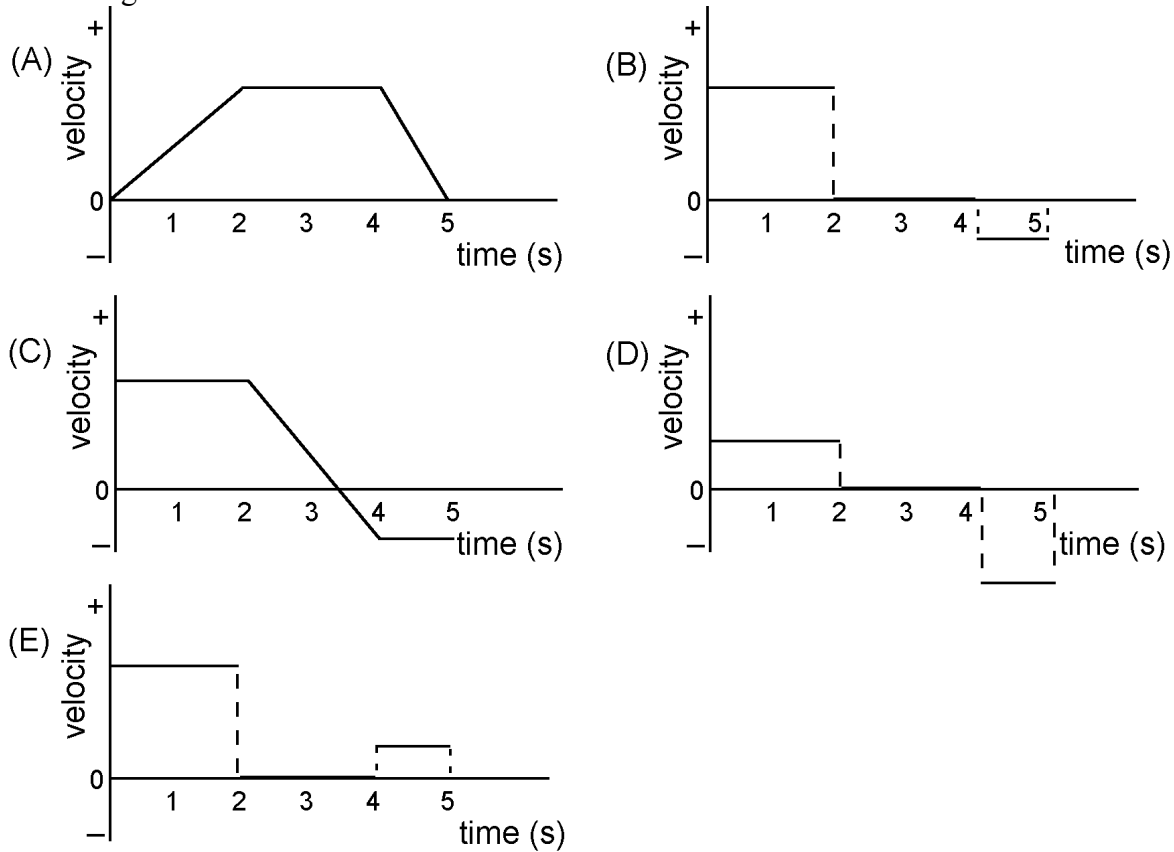
7. An object starts from rest and undergoes a positive, constant acceleration for ten seconds. It then continues on with constant positive velocity. Which of the following graphs correctly describes this situation?



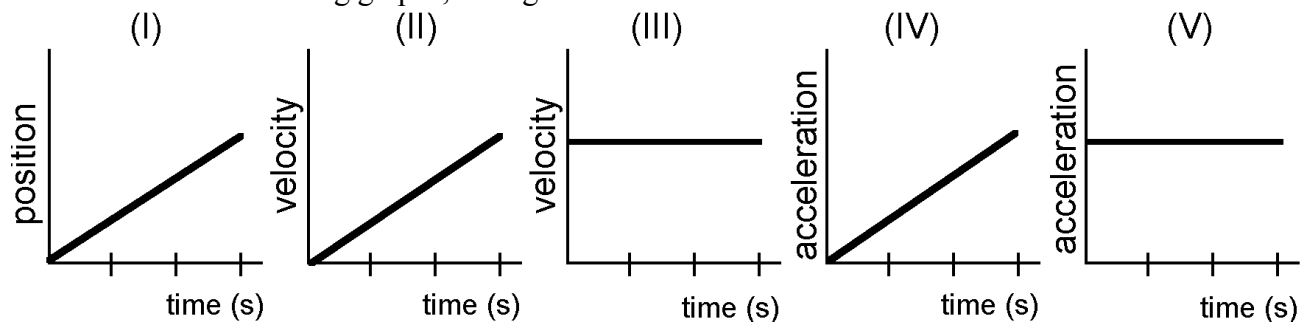
8. At right is a position-time graph for an object during a 5 s interval.



Which one of the following graphs of velocity vs time would best represent the object's motion during the same time interval?



9. Consider the following graphs, noting the different axes:

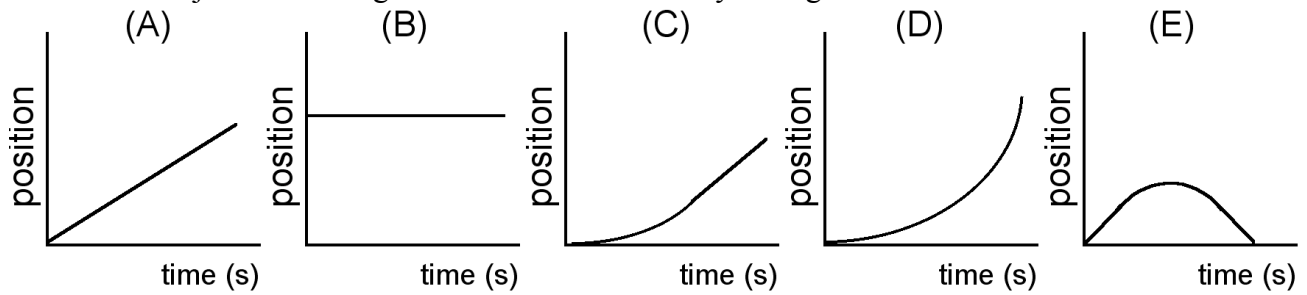


Which of these represent(s) motion at constant velocity?

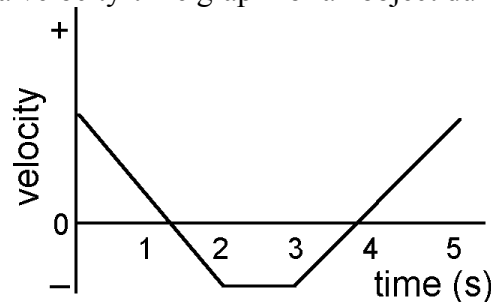
- A) I, II, and IV
- B) I and III
- C) II and V
- D) IV only
- E) V only

10. Position vs time graphs for five objects are shown below. All axes have the same scale.

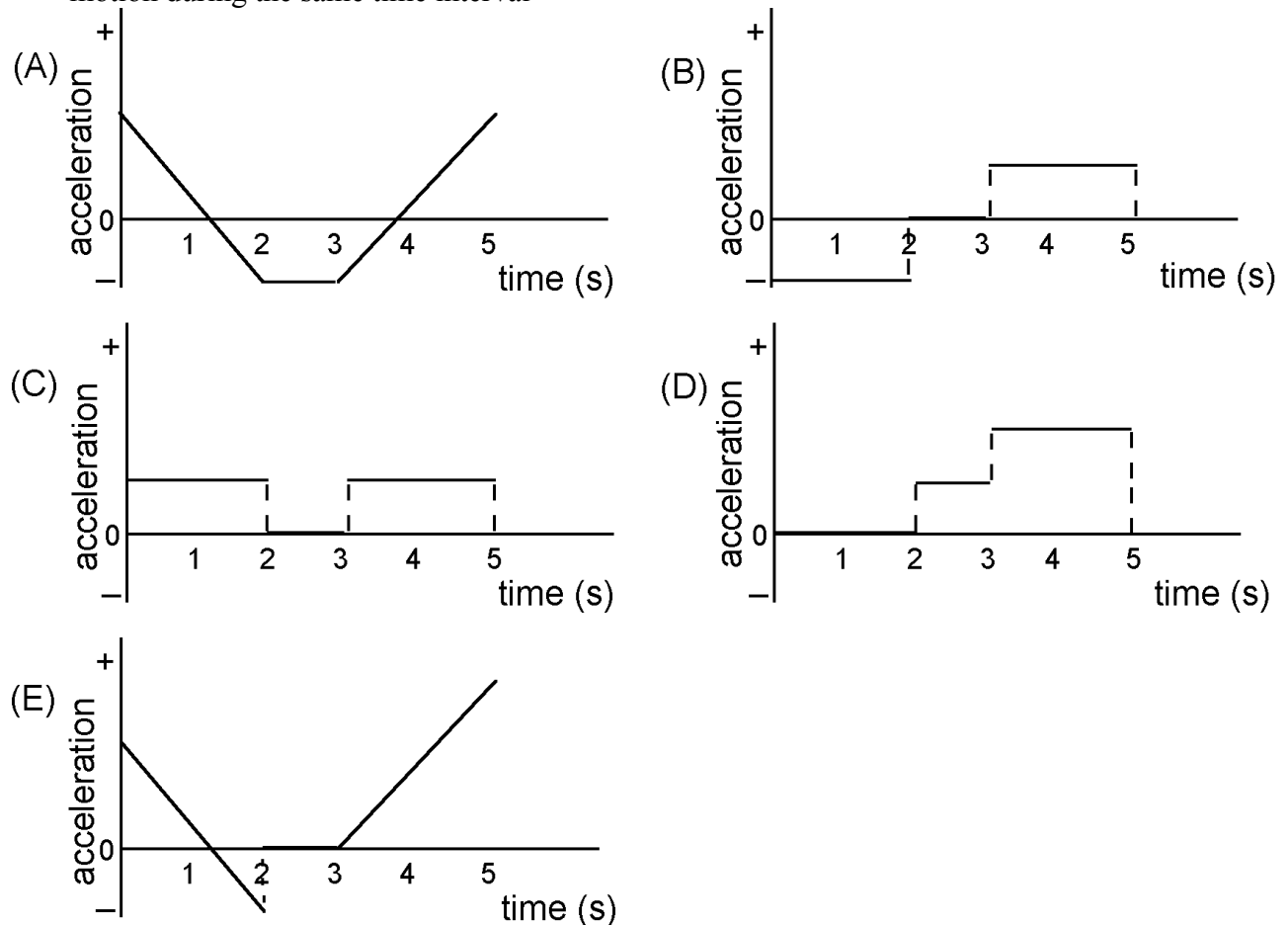
Which object had the highest instantaneous velocity during the interval?



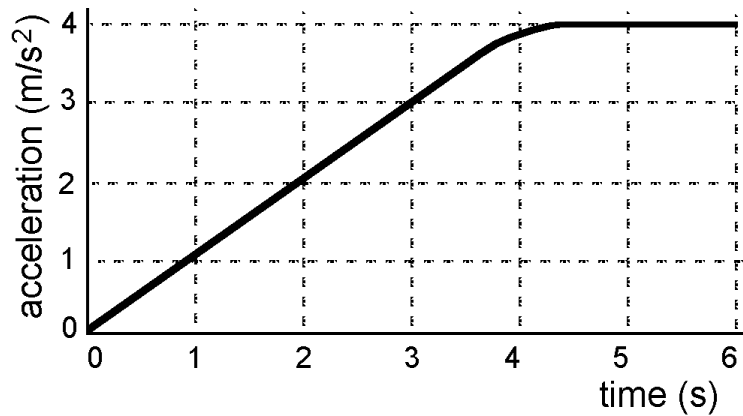
11. The following represents a velocity-time graph for an object during a 5 s interval.



Which one of the following graphs of acceleration vs time would best represent the object's motion during the same time interval



12. An object accelerates according to the graph below:

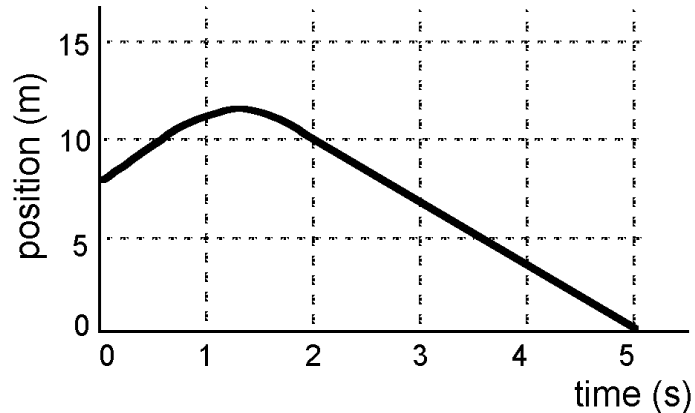


The object's change in velocity during the first three seconds of motion was:

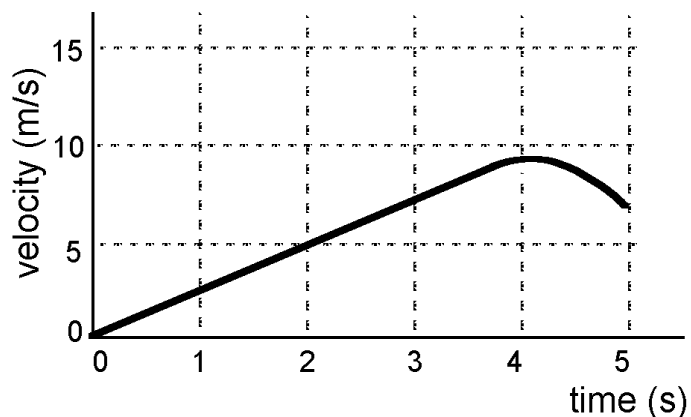
- A) 0.66 m/s B) 1.0 m/s C) 3.0 m/s D) 4.5 m/s E) 9.8 m/s

13. The velocity at the 3 s point is about:

- A) - 3.3 m/s
 B) - 2.0 m/s
 C) - 0.67 m/s
 D) 5.0 m/s
 E) 7.0 m/s

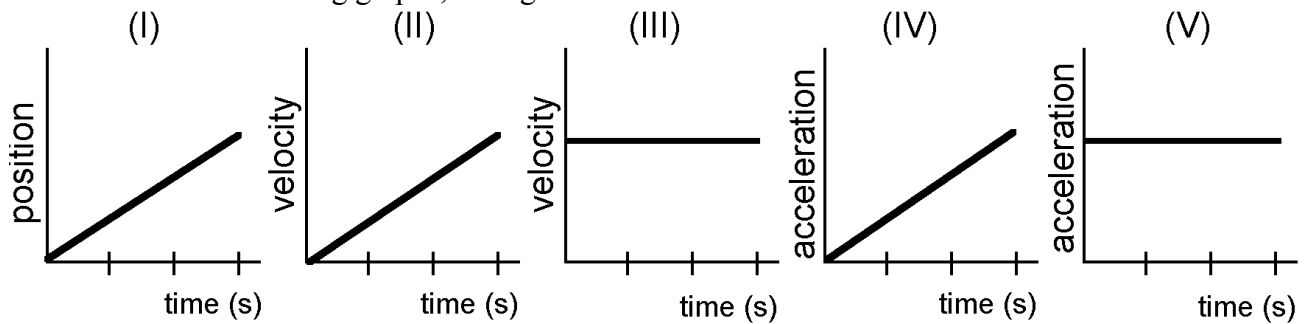


14. If you wanted to know the distance covered during the interval from $t = 0$ s to $t = 2$ s, from the graph below you would



- A) Read 5 directly off the vertical axis
 B) Find the area between that line segment and the time axis by calculation $(5 \times 2) / 2$.
 C) Find the slope of that line segment by dividing 5 by 2.
 D) Find the slope of that line segment by dividing 15 by 5.
 E) Not enough information to answer.

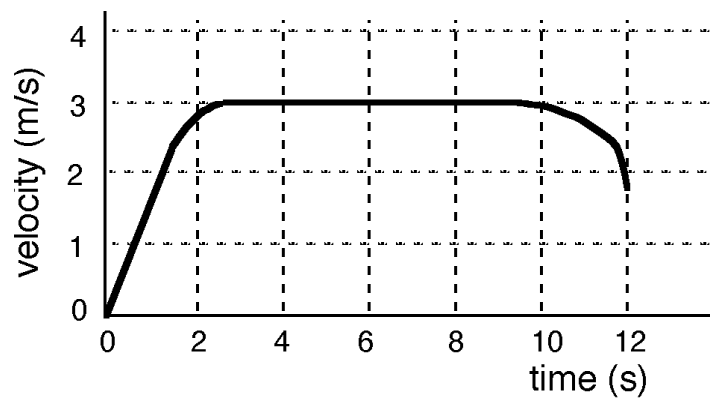
15. Consider the following graphs, noting the different axes:



Which of these represent(s) motion at constant, non-zero acceleration?

- A) I, II, and IV
- B) I and III
- C) II and V
- D) IV only
- E) V only

16. An object moves according to the graph below:

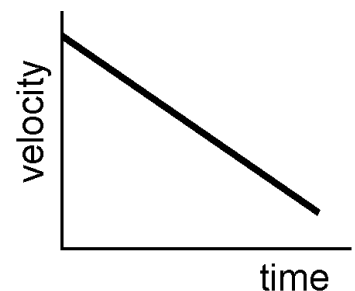


How far does it move during the interval from $t = 4$ s to $t = 8$ s?

- A) 0.75 m
- B) 3.0 m
- C) 4.0 m
- D) 8.0 m
- E) 12.0 m

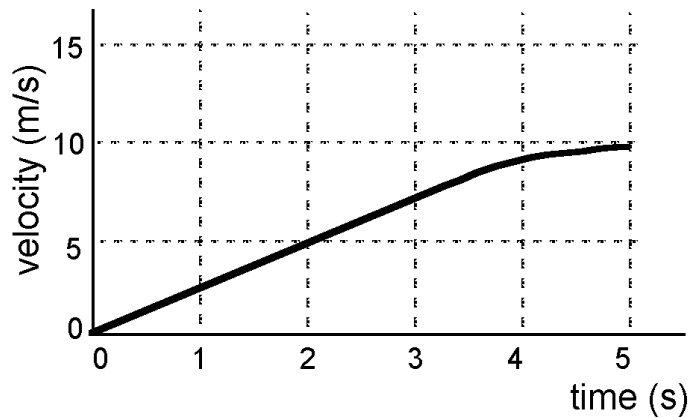
17. To the right is a graph of an object's motion. Which sentence gives the best interpretation?

- A) The object is moving with a constant acceleration.
- B) The object is moving with a uniformly decreasing acceleration.
- C) The object is moving with a uniformly increasing velocity.
- D) The object is moving at a constant velocity.
- E) The object does not move.

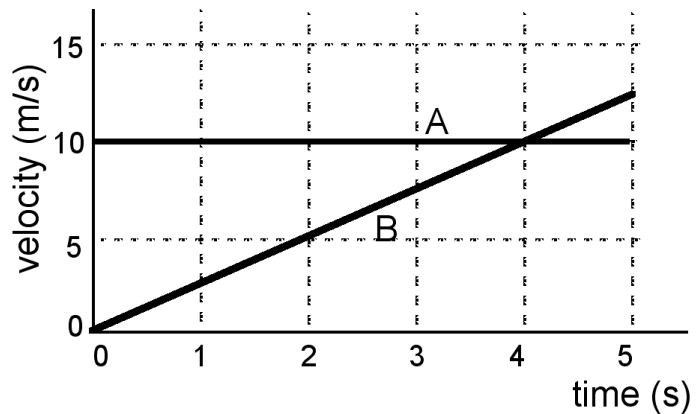


18. The velocity at the 2 second point is:

- A) 0.4 m/s
- B) 2.0 m/s
- C) 2.5 m/s
- D) 5.0 m/s
- E) 10.0 m/s

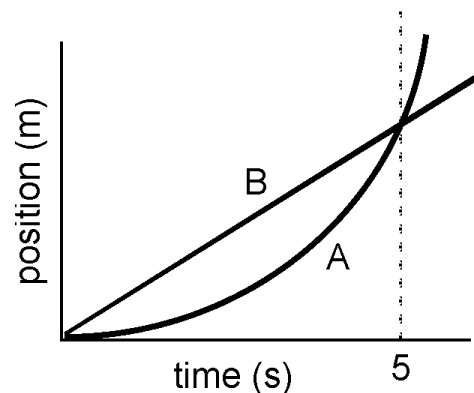


19. The following represents the velocity-time graph for two objects, A and B. Which of the following statements is true?



- A) At $t = 4$ s, object B catches up to object A.
- B) Over the first 4 s, object B has an average velocity of 5 m/s.
- C) At $t = 4$ s, both objects have covered the same distance.
- D) Object A is motionless.
- E) Object B is moving with constant, positive velocity.

20. At right is the position-time graph for two objects A and B. Which of the following statements is true?



- A) Object B has a greater velocity than object A for the entire time interval 0 to 5 seconds
- B) At 5 seconds, object A has a greater velocity than object B.
- C) The velocity of object A equals the velocity of object B at 5 seconds.
- D) Object A has a constant velocity.
- E) Object B is accelerating.