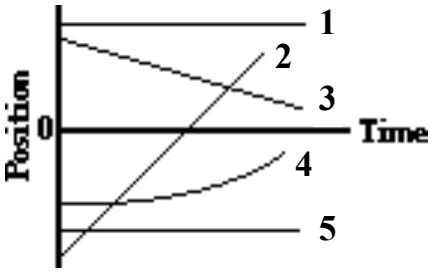
Physics 50 Interpreting Kinematics Graphs

For each question, choose only one letter A–E as your answer. Record your answers on a scantron sheet (882-E or compatible with that) and submit the scantron sheet on the due date.

This diagram refers to questions 1–6.



1. Which particle(s) is(are) at rest and remaining at rest?

   (A) 1 and 5
   (B) 1 only
   (C) 2
   (D) 3
   (E) none

2. Which particle is moving fastest?

   (A) 1
   (B) 2
   (C) 3
   (D) 4
   (E) 5

3. Which particle(s) is(are) *moving* at constant velocity?

   (A) 1 and 5
   (B) 2 and 3
   (C) 1, 2, 3, and 5
   (D) 4
   (E) none

4. Which particle(s) change(s) direction?

   (A) 1 and 5
   (B) 2 only
   (C) 2 and 3
   (D) 4
   (E) none

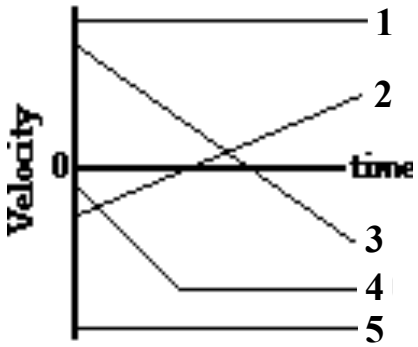
5. Which particle(s) is(are) accelerating?

   (A) 1 and 5
   (B) 2, 3, and 4
   (C) 4 only
   (D) all
   (E) none

6. Which particle(s) is(are) moving in the same direction as particle 2?

   (A) 1
   (B) 5
   (C) 3 only
   (D) 4 only
   (E) 3 and 4

This diagram refers to questions 7–13.



7. Which particle(s) is(are) at rest and remaining at rest?

   (A) 1 and 5
   (B) 1 only
   (C) 2
   (D) 3
   (E) none

8. Which particle(s) is(are) at rest momentarily during the time shown?

   (A) 1 and 5 only
   (B) 2 and 3
   (C) 4 only
   (D) 1, 4, and 5
   (E) none

9. Which particle(s) is(are) moving at constant velocity?

   (A) 1 and 5
   (B) 2 and 3
   (C) 1, 2, 3, and 5
   (D) 4
   (E) none

10. Which particle(s) change(s) its direction?

    (A) 1 and 5
    (B) 2 only
    (C) 2 and 3
    (D) 4
    (E) none

11. Which particle(s) is(are) moving in the same direction as particle 5 for the entire time shown?

    (A) 1
    (B) 2
    (C) 3 only
    (D) 4 only
    (E) 3 and 4

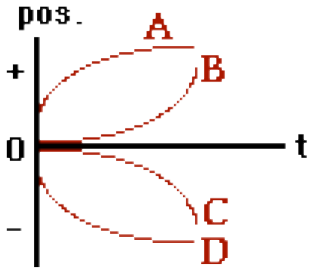
12. Which particle(s) is(are) accelerating?

    (A) 1 and 5
    (B) 2, 3, and 4
    (C) 4 only
    (D) all
    (E) none

13. Which particle has the smallest magnitude non-zero acceleration?

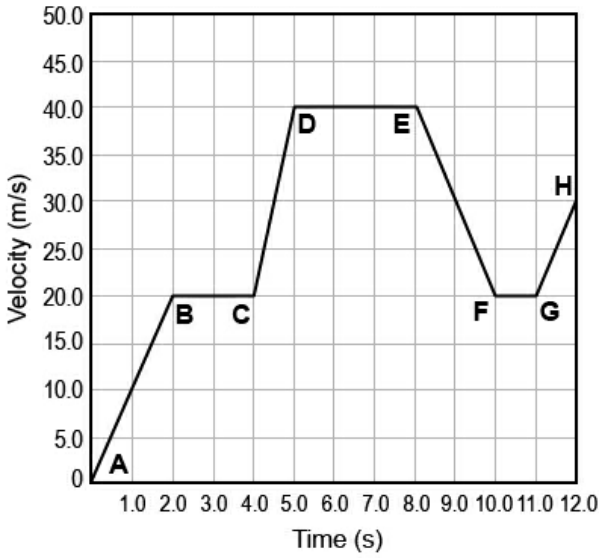
    (A) 1
    (B) 2
    (C) 3
    (D) 4
    (E) 5

14. Which particle is moving in the negative direction and slowing down?



    (A) A
    (B) B
    (C) C
    (D) D
    (E) none

Consider this velocity time graph for a particle, and use it to answer questions 15–25.



15. Which best describes the motion of the particle from A to B?

    (A) The particle moves in the positive direction at a constant velocity of 10 m/s for 2 seconds.

    (B) The particle moves in the positive direction at a constant velocity of 20 m/s for 2 seconds.

    (C) The particle starts from rest and accelerates at a constant rate of 10 m/s^2 in the positive direction for 2 seconds.

    (D) The particle starts from rest and accelerates at a constant rate of 20 m/s^2 in the positive direction for 2 seconds.

    (E) The particle moves with increasing acceleration for 2 seconds.

16. As the particle moves from B to C,

    (A) its acceleration is zero

    (B) it moves at a constant velocity

    (C) it moves in the positive direction

    (D) all of the above are true

    (E) only two of the above are true

17. What is the displacement of the particle from B to C?

    (A) 20 m

    (B) 40 m

    (C) 40 m/s

    (D) 10 m

    (E) 10 m/s^2

18. Which best describes the motion of the particle from C to D?

    (A) The particle moves with constant velocity in the positive direction for 1 second.

    (B) The particle moves in the negative direction, slowing down at a constant rate for 1 second.

    (C) The particle speeds up in the positive direction, moving with constant acceleration for 1 second.

    (D) The particle's acceleration increases at a constant rate for 1 second.

    (E) The particle's acceleration decreases at a constant rate for 2 seconds.

19. What is the acceleration of the particle from C to D?

    (A) 10 m/s^2

    (B) -10 m/s^2

    (C) 20 m/s^2

    (D) -20 m/s^2

    (E) 40 m/s^2

20. What is the displacement of the particle from C to D?

    (A) 20 m

    (B) 30 m

    (C) 40 m

    (D) 80 m

    (E) 90 m

21. What is the average acceleration of the particle from A to D?

    (A) 8 m/s^2

    (B) 10 m/s^2

    (C) -10 m/s^2

    (D) 20 m/s^2

    (E) 40 m/s^2

22. What is the displacement of the particle from A to D?

    (A) 30 m

    (B) 40 m

    (C) 60 m

    (D) 90 m

    (E) 120 m

23. Which best describes the motion of the particle from E to F?

    (A) The particle moves in the negative direction, speeding up with constant acceleration.

    (B) The particle moves in the positive direction, slowing down with constant acceleration.

    (C) The particle moves in the positive direction, with constant velocity.

    (D) The particle moves in the positive direction, with speeding up with constant acceleration.

    (E) The particle moves in the negative direction, slowing down with constant acceleration.

24. What is the acceleration of the particle from E to F?

    (A) 10 m/s^2

    (B) -10 m/s^2

    (C) 20 m/s^2

    (D) -20 m/s^2

    (E) 40 m/s^2

25. What is the final position of the particle at H, assuming it starts at $x = 0$?

    (A) 90 m

    (B) 195 m

    (C) 255 m

    (D) 295 m

    (E) 315 m