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AP Physics 1 - Test 02 - 1D Constant Acceleration Score: ______

1. The position of an object is given as a function of time by $x=7t-3t^2$, where x is in meters and t is in seconds. Its average velocity over the interval from t=0 to t=4 is:

- (A) 5 m/s
- (B) -5 m/s
- (C) 11 m/s
- (D) -11 m/s
- (E) -14.5 m/s

2. Of the following situations, which one is impossible?

- (A) A body having velocity east and acceleration east.
- (B) A body having velocity east and acceleration west.
- (C) A body having zero velocity and non-zero acceleration.
- (D) A body having constant acceleration and a changing velocity.
- (E) A body having constant velocity and a changing acceleration.

3. A car, initially at rest, travels 20m in 4s along a straight line with constant acceleration. The acceleration of the car is:

- (A) 0.4 m/s^2
- (B) 1.3 m/s^2
- (C) 2.5 m/s^2
- (D) 4.9 m/s^2
- (E) 9.8 m/s^2

4. A racing car traveling with constant acceleration increases its speed from 10m/s to 50m/s over a distance of 60m. How long does this take?

- (A) 2.0 s
- (B) 4.0 s
- (C) 5.0 s
- (D) 8.0 s
- (E) 10.0 s

5. A car starts from rest and goes down a slope with a constant acceleration of 5.0 m/s^2. After 5 s the car reaches the bottome of the hill. Its speed at the bottom of the hill is:

- (A) 1 m/s
- (B) 12.5 m/s

C 25 m/s

D 50 m/s

E 160 m/s

6. A car moving with an initial velocity of 25 m/s north has a constant acceleration of 3 m/s^2 south. After 6 seconds, its velocity will be:

A 7 m/s north

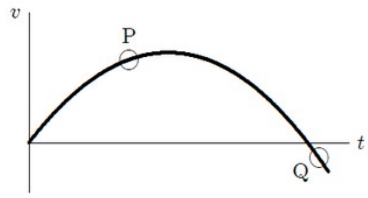
B 7 m/s south

C 43 m/s north

D 20 m/s north

E 20 m/s south

7. The diagram shows a velocity-time graph for a car moving in a straight line. At point Q, the car must be:



A moving with a zero acceleration

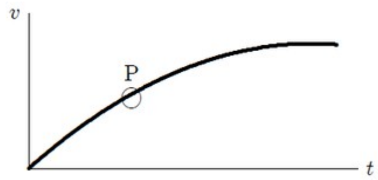
B traveling downhill

C traveling below ground level

D reducing speed

E traveling in the reverse direction to that at point P

8. The diagram shows a velocity-time graph for a car moving in a straight line. At point P the car must be:



A moving with zero acceleration

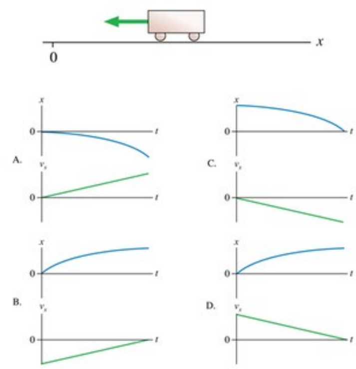
B climbing a hill

C accelerating

D stationary

E traveling backwards

9. A cart accelerates toward the origin as indicated on the diagram. What would the position vs. time and velocity vs. time graphs look like?



A A

B B

C C

D D

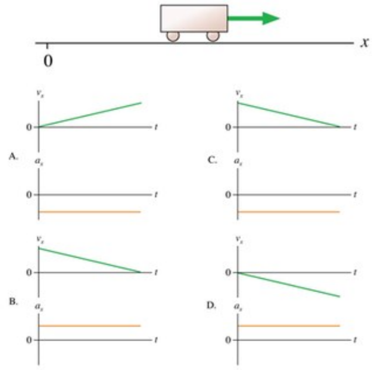
10. A cart ***slows down*** while moving away from the origin. What do the velocity and acceleration graphs look like?

Ⓐ A

Ⓑ B

Ⓒ C

Ⓓ D



11. Question 11

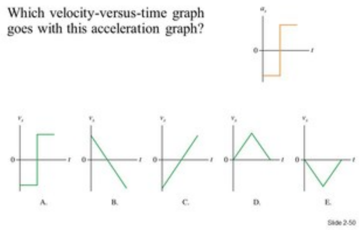
Ⓐ A

Ⓑ B

Ⓒ C

Ⓓ D

Ⓔ E



12. A car moves along a straight stretch of road. The following graph shows the car’s position as a function of time:

At what point(s) is the displacement zero?

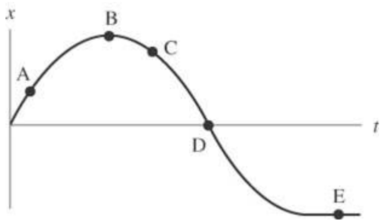
Ⓐ A

Ⓑ B

Ⓒ C

Ⓓ D

Ⓔ E



13. A car moves along a straight stretch of road. The following graph shows the car’s position as a function of time:

At what point(s) is the speed zero?

Ⓐ A

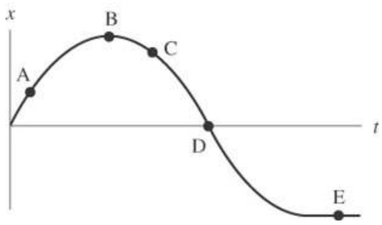
Ⓑ B

Ⓒ C

Ⓓ D

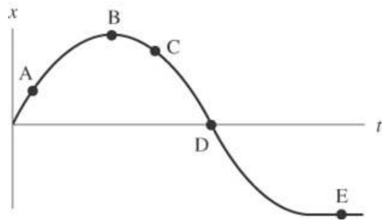
Ⓔ E

Ⓕ B & E



14. A car moves along a straight stretch of road. The following graph shows the car’s position as a function of time:

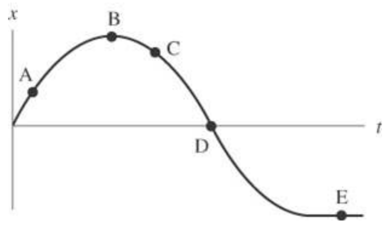
At what point(s) is the speed increasing?



(A) A
(B) B
(C) C
(D) D
(E) E
(F) C & D

15. A car moves along a straight stretch of road. The following graph shows the car’s position as a function of time:

At what point(s) is the speed decreasing?



(A) A
(B) B
(C) C
(D) D
(E) E

16. The <u>area</u> of a ***velocity vs. time*** graph respresents:

(A) Acceleration
(B) Displacement
(C) Average velocity
(D) Instantaneous velocity
(E) None of the above

17. The <u>slope</u> of a ***velocity vs. time*** graph represents:

(A) Acceleration
(B) Displacement
(C) Average velocity
(D) Instantaneous velocity
(E) None of the above

18. The <u>slope</u> of an ***acceleration vs. time*** graph respresents:

(A) Acceleration
(B) Displacement
(C) Average velocity

- (D) Instantaneous velocity
- (E) None of the above

19. The <u>area</u> of an ***acceleration vs. time*** graph represents:

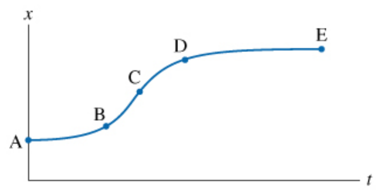
- (A) Acceleration
- (B) Displacement
- (C) Instantaneous velocity
- (D) Change in velocity
- (E) None of the above

20. When ***<u>must</u>*** an object "Slow Down"?

- (A) When acceleration and velocity point in opposite directions
- (B) When acceleration is negative
- (C) When acceleration and velocity point in the same direction
- (D) When velocity is negative
- (E) When velocity and acceleration are both constant

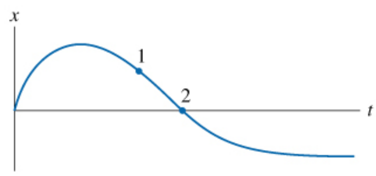
21. The following graph is a position vs time graph. At which instance of time is the speed the greatest?

- (A) A
- (B) B
- (C) C
- (D) D
- (E) E



22. The following graph is a position vs. time graph. The velocity at instant 1 is ____________ while the velocity at instant 2 is ______________

- (A) positive, negative
- (B) positive, negative
- (C) negative, negative
- (D) negative, positive
- (E) positive, zero



23. A car is traveling at v_x=36 m/s. The driver applies the brakes and the car decelerates at 6.0 m/s^2. What is the stopping distance?

- (A) 4.0 m
- (B) 130 m
- (C) 120 m

D) 110 m

24. Car A can go from 0 to 60mph in 16s.

Car B is capable of maintaining twice the acceleration of that of Car A, even ar higher speeds. How much time would be required for Car B to go from 0 to120mph?

A) 4.0 s

B) 12 s

C) 16 s

D) 8.0 s

25. Chameleons catch insects with their tongues, which they can rapidly extend to great lengths. In a typical strike, the chameleon's tongue accelerates at a remarkable 260 m/s^2 for 20ms, then travels at a constand velocity for another 30ms.

During the total time of 50ms, how far does the tongue reach?

A) 0.208 m (20.8 cm)

B) 1.23 m (123 cm)

C) 0.052 (5.2 cm)

D) 2.53 m (253 cm)

E) 0.156 m (15.6 cm)

26. Suppose a racer must finish a race with an average velocity of 150 km/h. If he starts with a velocity of 100 km/h and assuming constant acceleration, what velocity must he finish the race with?

A) 150 km/h

B) 100 km/h

C) 200 km/h

D) 273 km/h

E) 50 km/h

27. An object slides down a ramp. Which of the following statements are true?

A) Speed increases

B) Acceleration increases

C) Both Speed and Acceleration Increases

D) None of the above

28. Suppose you take a trip that covers 180 km and takes 3 hours to make. Your average velocity it

A) 30 km/h

B) 60 km/h

C) 180 km/h

D) 360 km/h

E) 540 km/h

29. A car accelerates at 2 m/s^2. Assuming the car starts from rest, how much time does it need to accelerate to a velocity of 20 m/s?

A) 2 seconds

B) 10 seconds

C) 20 seconds

D) 40 seconds

E) none of the above

30. Suppose an object has an initial velocity of 40 m/s and has an acceleration of -10 m/s^2. How long will it take the object to return to its original position?

A) 4 seconds

B) 8 seconds

C) 10 seconds

D) 400 seconds

E) It will never return to its original position

31. A vector quantity is a quantity that has

A) magnitude and time

B) time and direction

C) magnitude and direction

32. Acceleration is defined by a CHANGE in

A) time it takes to move from one place to another place

B) velocity of an object

C) distance divided by the time interval

D) velocity divided by the time interval

E) time it takes to move from one speed to another speed

33. When you look at the speedometer in a moving car, you can see the car's

A) average distance traveled

B) instantaneous acceleration

C) average speed

D) instantaneous speed

E) average acceleration

34. Challenge Question: Suppose you are in a car that is going around a curve. The speedometer reads a constant 30 mph. Which of the following is NOT true.

- (A) You and the car are accelerating
- (B) Your acceleration is constantly changing
- (C) Your velocity is constant
- (D) Your direction is constantly changing
- (E) Your speed is constant

35. It is possible to have a positive acceleration and a negative velocity at the same instant.

- (A) True
- (B) False

36. If an objects velocity is zero, then its acceleration must also be zero.

- (A) True
- (B) False