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Student Number

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Physics Assessment

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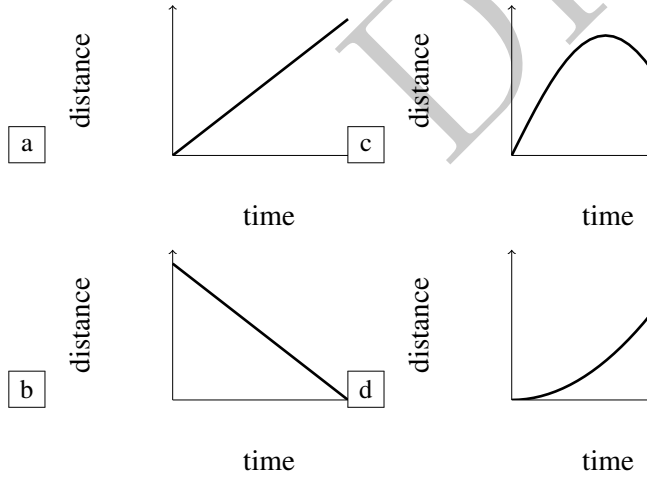
Q1 Starting from rest, a car uniformly accelerates to a speed of 7.60 m/s in a time of 3.00 s. Through what distance does the cart move in this time?

a 22.8 m c 16.1 m e 5.7 m
b 11.4 m d 8.1 m

Q2 A car travels at 20.0 mile/h. Which one of the following choices best represents the speed of the car in SI units of meter per second (m/s)?

a 0.75 m/s c 533 m/s e 8.9 m/s
b 45.0 m/s d 20.0 m/s

Q3 A cart travels with a constant nonzero acceleration along a straight line. Which graph best represents the relationship between the distance the cart travels and the time of travel?



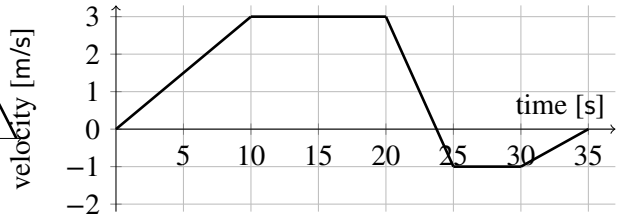
Q4 A cart is initially moving at 0.5 m/s along a track. The cart comes to rest after traveling 1 m. The experiment is repeated on the same track, but now the cart is initially moving at 1 m/s. How far does the cart travel before coming to rest?

a 5 m c 4 m e 3 m
b 1 m d 2 m

Q5 A rectangular plate has a length of 47 in and a width of 20 in. What is the area of the plate?

a 1.29×10^{-2} m^2 d $1.21 \times 10^{+1}$ m^2
b $2.85 \times 10^{+1}$ m^2 e 3.91×10^{-4} m^2
c 6.06×10^{-1} m^2 f $2.39 \times 10^{+1}$ m^2

Q6 The graph shown below is a plot of the car's velocity in the x direction, v_x, versus time, t.



During what time interval was the car moving towards its initial position at constant velocity?

a 20 s to 25 s d 10 s to 20 s
b 25 s to 30 s e 30 s to 35 s
c 0 s to 10 s

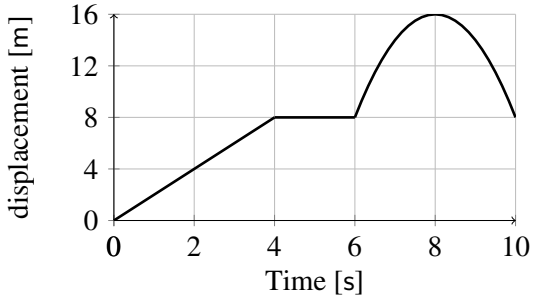
Q7 A rock falls freely from rest near the surface of a planet where the acceleration due to gravity is 4.0 m/s^2. What is the speed of this rock after it falls 32 m?

a 32 m/s c 16 m/s
b 25 m/s d 8.0 m/s

Q8 A 1000 kg car traveling with a velocity of +20 m/s decelerates at $-5.0\ \text{m/s}^2$ until it comes to rest. What is the total distance the car travels as it decelerates to rest?

[a] 40 m
[c] 80 m
[b] 10 m
[d] 20 m

Q9 The graph below represents the displacement of an object moving in a straight line as a function of time.



What was the total distance traveled by the object during the 10 s time interval?

[a] 16 m
[c] 8 m
[b] 24 m
[d] 0 m

Q10 A rectangular building lot measures 90 ft by 66 ft. What is the area of the lot?

[a] $6.13 \times 10^{0}\ \text{m}^2$
[d] $5.13 \times 10^{+1}\ \text{m}^2$
[b] $5.94 \times 10^{+3}\ \text{m}^2$
[e] $1.81 \times 10^{+3}\ \text{m}^2$
[c] $3.64 \times 10^{+4}\ \text{m}^2$
[f] $5.52 \times 10^{+2}\ \text{m}^2$

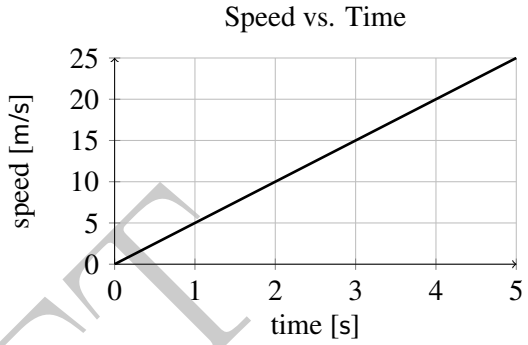
Q11 Suppose two cars are racing on a circular track 1 km in circumference. The first car can circle the track in 15 s at top speed while the second car can circle the track in 12 s at top speed. How much lead does the first car need starting the last lap of the race not to lose?

[a] at least 104 m
[d] at least 83 m
[b] at least 200 m
[e] at least 250 m
[c] at least 67 m

Q12 A ball dropped from a bridge takes 3.0 s to reach the water below. How far is the bridge above the water?

[a] 44 m
[c] 29 m
[b] 88 m
[d] 15 m

Q13 The graph below represents the relationship between speed and time for an object moving along a straight line.



What is the total distance traveled by the object during the first 4 s?

[a] 40 m
[c] 20 m
[b] 5 m
[d] 80 m

Q14 A toy car moves 0.80 m in 1.0 s at the constant velocity. If it continues, how far will it travel in 3.0 s?

[a] 2.4 m
[c] 3.6 m
[e] 7.2 m
[b] 14.4 m
[d] 4.8 m

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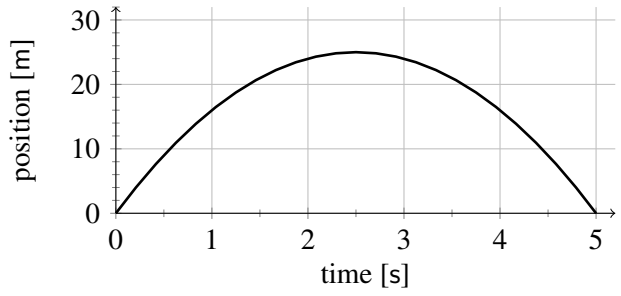
Q1 The position-time, y vs. t, graph for the motion of an object is shown.



What would be a reasonable equation for the acceleration a that would account for this motion?

- [a] a = negative constant times t
- [b] $a = 0$
- [c] a = positive constant
- [d] a = positive constant times t
- [e] a = negative constant

Q2 An object is dropped from rest and falls freely 20 m to Earth. When is the speed of the object 9.8 m/s?

- [a] after it has fallen 9.8 m
- [b] at the end of its first second of fall
- [c] during the entire first second of its fall
- [d] during its entire time of fall

Q3 Car A, moving in a straight line at a constant speed of 20.0 m/s, is initially 200 m behind car B, moving in the same straight line at a constant speed of 15 m/s. How far must car A travel from this initial position before it catches up with car B?

- [a] 400 m
- [b] 200 m
- [c] 1000 m
- [d] 800 m

Q4 A vehicle completes one lap around a circular track at an average speed of 50 m/s and then completes a second lap at an average speed of V. The average speed of the vehicle for the completion of both laps was 80 m/s. What was the average speed V of the second lap?

- [a] 110 m/s
- [b] 150 m/s
- [c] 125 m/s
- [d] 100 m/s
- [e] 200 m/s

Q5 A race car starting from rest accelerates uniformly at a rate of 4.9 m/s^2. What is the car's speed after it has traveled 200 m.

- [a] 31.3 m/s
- [b] 62.6 m/s
- [c] 44.3 m/s
- [d] 1960 m/s

Q6 If a car accelerates uniformly from rest to 15 m/s over a distance of 100 m, the magnitude of a car's acceleration is:

- [a] 0.15 m/s^2
- [b] 1.1 m/s^2
- [c] 2.3 m/s^2
- [d] 6.7 m/s^2

Q7 A baseball dropped from the roof of a tall building takes 3.1 s to hit the ground. How tall is the building? [Neglect friction.]

- [a] 30 m
- [b] 94 m
- [c] 47 m
- [d] 15 m

Q8 Which object weighs approximately 1 N?

- [a] paper clip
- [b] physics student
- [c] golf ball
- [d] dime

Q9 Is it possible for an object's velocity to increase while its acceleration decreases?

[a] Yes, an example would be a falling object in the presence of air resistance

[b] Yes, an example would be a falling object near the surface of the moon.

[c] No, this is impossible because of the way in which acceleration is defined.

[d] No, because if acceleration is decreasing the object will be slowing down.

[e] No, because velocity and acceleration must always be in the same direction.

Q10 An object of mass 5.00 kg moves only to the right along the $+x$-axis. During some time interval, the object's speed increased from 4.00 m/s to 8.00 m/s with a constant acceleration of 2.00 m/s^2. Through what distance does the object move during the time interval of the acceleration?

[a] 24.0 m [c] 12.0 m [e] 8.00 m

[b] 2.00 m [d] 4.00 m

Q11 A swimming pool holds 580 000 gallons of water. How much water is that equivalent to in SI units?

[a] $2.20 \times 10^{+1}$ m^3 [d] $3.15 \times 10^{+4}$ m^3

[b] $2.20 \times 10^{+7}$ m^3 [e] $5.80 \times 10^{+2}$ m^3

[c] $8.31 \times 10^{+3}$ m^3 [f] $2.20 \times 10^{+3}$ m^3

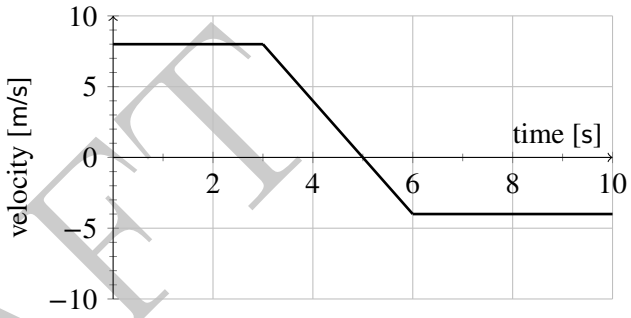
Q12 A fish tank has internal dimension of 28 in long, 18 in wide, and 18 in high. What is the maximum amount of water that the fish tank can hold?

[a] 4.88×10^{-1} m^3 [d] $9.07 \times 10^{+3}$ m^3

[b] 3.78×10^{-3} m^3 [e] 1.49×10^{-1} m^3

[c] 5.85×10^{0} m^3 [f] 1.60×10^{0} m^3

Q13 The velocity vs. time graph for the motion of a car on a straight track is shown in the diagram. The thick line represents the velocity. Assume that the car starts at the origin $x = 0$.



What is the average speed of the car for the 10 s interval?

[a] 5.00 m/s [c] 1.20 m/s [e] 1.40 m/s

[b] 3.30 m/s [d] 5.40 m/s

Q14 Two automobiles are 150 km apart and traveling toward each other. One automobile is moving at 60 km/h and the other is moving 40 km/h. In how many hours will they meet?

[a] 1.75 h [c] 3.0 h [e] 2.0 h

[b] 2.5 h [d] 1.5 h