1. The graph below represents the relationship between velocity and time of travel for a toy car moving in a straight line.

![Velocity vs. Time Graph]

The shaded area under the line represents the toy car's

A) displacement  B) momentum  
C) acceleration  D) speed

2. The graph below represents the relationship between distance and time for an object.

![Distance vs. Time Graph]

What is the instantaneous speed of the object at t = 5.0 seconds?

A) 0 m/s  B) 2.0 m/s  
C) 5.0 m/s  D) 4.0 m/s

3. The uniform motion of a cart is shown in the distance versus time graph below. What is the average speed of the cart?

![Distance vs. Time Graph]

A) 0.5 m/s  B) 2 m/s  
C) 5 m/s  D) 50 m/s

4. The graph represents the motion of a cart. According to the graph, as time increases, the speed of the cart

A) decreases  B) increases  
C) remains the same

5. The displacement-time graph below represents the motion of a cart initially moving forward along a straight line.

![Displacement vs. Time Graph]

During which interval is the cart moving forward at constant speed?

A) AB  B) BC  C) CD  D) DE

6. The graph below represents the motion of an object traveling in a straight line as a function of time. What is the average speed of the object during the first four seconds?

![Displacement vs. Time Graph]

A) 1 m/s  B) 2 m/s  
C) 0.5 m/s  D) 0 m/s
7. Which two graphs best represent the motion of an object falling freely from rest near Earth's surface?

A) ![Graph A]

B) ![Graph B]

C) ![Graph C]

D) ![Graph D]

8. The distance-time graph represents the motion of a laboratory cart. According to this graph, the cart is

A) slowing down  
B) speeding up  
C) not moving  
D) moving at a constant speed

Base your answers to questions 9 and 10 on the graph below which represents the displacement of an object as a function of time.

![Displacement-Time Graph]

9. What is the average velocity of the object from \( t = 0 \) to \( t = 3 \) seconds?

A) 1.0 m/s  
B) 2.0 m/s  
C) 3.0 m/s  
D) 0 m/s

10. During which time interval is the object accelerating?

A) 0-2 s  
B) 2-3 s  
C) 3-4 s  
D) 4-6 s
11. Base your answer to the following question on the graph below, which represents the relationship between the displacement of an object and its time of travel along a straight line.

![Displacement vs. Time Graph]

What is the average speed of the object during the first 4.0 seconds?

A) 0 m/s  
B) 2 m/s  
C) 8 m/s  
D) 4 m/s

12. Base your answer to the following question on the graph below, which represents the motion of a car during a 6.0-second time interval.

![Velocity vs. Time Graph]

What is the acceleration of the car at $t = 5.0$ seconds?

A) 0.0 m/s$^2$  
B) 2.0 m/s$^2$  
C) 2.5 m/s$^2$  
D) 10. m/s$^2$
13. Base your answer to the following question on the graph below which represents the relationship between velocity and time for a 2.0-kilogram cart that is initially at rest and starts moving northward.

In which direction is the cart traveling at t = 4 seconds?
A) north  B) east  C) south  D) west

Base your answers to questions 14 and 15 on the accompanying graph which represents the motions of four cars on a straight road.

14. The speed of car C at t = 20 seconds is closest to
A) 60 m/sec  B) 45 m/sec  C) 3.0 m/sec  D) 600 m/sec

15. Which graph best represents the relationship between distance and time for car C?
A)  
B)  
C)  
D)  
16. The graph below shows the speed of an object plotted against the time.

![Graph showing speed vs. time]

The total distance traveled by the object during the first 4 seconds is

A) 0.5 meter    B) 2 meters    C) 8 meters    D) 4 meters

17. Cars A and B both start from rest at the same location at the same time.

![Graph showing speed vs. time for cars A and B]

Compared to the total distance traveled by car B during the 10 seconds, the total distance traveled by car A is

A) less    B) greater    C) the same
18. Base your answer to the following question on the graph below which represents the relationship between speed and time for an object in motion along a straight line.

During which interval is the object’s acceleration the greatest?

A) AB  B) CD  C) DE  D) EF

Base your answers to questions 19 through 21 on the graph below, which represents the motion of cars A and B on a straight track. Car B passes car A at the same instant that car A starts from rest at t = 0 seconds.

19. What is the acceleration of car A during the interval between t = 0 and t = 60?

A) 1 m./sec./sec.  B) 10 m./sec./sec.  C) 20 m./sec./sec.  D) 30 m./sec./sec.

20. How far did car A travel in the interval between t = 0 and t = 60?

A) 30 m.  B) 360 m.  C) 1,800 m.  D) 3,600 m.
21. Which distance-time graph best represents the motion of car B during the time interval between $t = 0$ and $t = 60$?

A) ![Graph A]
B) ![Graph B]
C) ![Graph C]
D) ![Graph D]

22. While taking off from an aircraft carrier, a jet starting from rest accelerates uniformly to a final speed of 40 meters per second on a runway that is 70 meters long. What is the magnitude of the acceleration of the jet?

A) $0.29 \text{ m/s}^2$  
B) $0.57 \text{ m/s}^2$  
C) $1.8 \text{ m/s}^2$  
D) $11 \text{ m/s}^2$

23. Cars A and B both start from rest at the same location at the same time.

What is the magnitude of the acceleration of car A during the period between $t = 8$ seconds and $t = 10$ seconds?

A) $20 \text{ m/s}^2$  
B) $16 \text{ m/s}^2$  
C) $8 \text{ m/s}^2$  
D) $4 \text{ m/s}^2$

24. The graph below represents the relationship between speed and time for a car moving in a straight line.

The magnitude of the car's acceleration is

A) $1.0 \text{ m/s}^2$  
B) $0.10 \text{ m/s}^2$  
C) $10 \text{ m/s}^2$  
D) $0.0 \text{ m/s}^2$
Base your answers to questions 25 through 28 on the graph below, which shows the velocity of a 1,500-kilogram car during a 20-second-time interval.

25. No unbalanced force is acting on the car during time interval
   A) BC  B) CD  C) EF  D) FG

26. The acceleration of the car during time interval AB is
   A) 0.40 m./sec.\(^2\)  B) 2.5 m./sec.\(^2\)  C) 10 m./sec.\(^2\)  D) 40 m./sec.\(^2\)

27. During time interval CD, the average velocity of the car is
   A) 7.5 m./sec.  B) 17.5 m./sec.  C) 15 m./sec.  D) 35 m./sec.

28. The impulse applied to the car during time interval AB is
   A) \(9.0 \times 10^4\) N-sec.  B) \(4.5 \times 10^3\) N-sec.  C) \(6.0 \times 10^3\) N-sec.  D) \(1.5 \times 10^4\) N-sec.

29. The diagram below represents the relationship between velocity and time of travel for four cars, A, B, C, and D, in straight-line motion.

Which car has the greatest acceleration during the time interval 10. seconds to 15 seconds?
   A) A  B) B  C) C  D) D

30. The graph below shows speed as a function of time for four cars A, B, C, and D, in straight-line motion.

Which car experienced the greatest average acceleration during this 6.0-second interval?
   A) car A  B) car B  C) car C  D) car D
31. Which graph best represents the motion of an object that was initially at rest and is accelerating uniformly?

A) \[ \text{Distance vs. Time} \]  
B) \[ \text{Distance vs. Time} \]  
C) \[ \text{Speed vs. Time} \]  
D) \[ \text{Speed vs. Time} \]

32. Cars A and B both start from rest at the same location at the same time.

\[ \text{SPEED (meters/second)} \]  
\[ \text{TIME (seconds)} \]

Compared to the speed of car B at 6 seconds, the speed of car A at 6 seconds is

A) less  
B) greater  
C) the same  

33. Which graph best represents an object in equilibrium moving in a straight line?

A) \[ \text{Distance vs. Time} \]  
B) \[ \text{Velocity vs. Time} \]  
C) \[ \text{Momentum vs. Time} \]  
D) \[ \text{Kinetic Energy vs. Time} \]
34. Which combination correctly pairs a vector quantity with its corresponding unit?
   A) weight and kg  
   B) velocity and m/s  
   C) speed and m/s  
   D) acceleration and m²/s

35. A 6.0-kilogram cart initially traveling at 4.0 meters per second east accelerates uniformly at 0.50 meter per second squared east for 3.0 seconds. What is the speed of the cart at the end of this 3.0 second interval?
   A) 1.5 m/s  
   B) 5.5 m/s  
   C) 3.0 m/s  
   D) 7.0 m/s

36. The speed of a car is increased uniformly from 11 meters per second to 19 meters per second. The average speed of the car during this interval is
   A) 0.0 m/s  
   B) 15 m/s  
   C) 30 m/s  
   D) 4.0 m/s