Review for motion (Bingo)

Big test 1

Motion

Multiple Choice (60%)

1. Which measurement of an average classroom door is closest to 1 meter?
   (1) thickness (3) height
   (2) width (4) surface area

2. An egg is dropped from a third-story window. The distance the egg falls from the window to the ground is closest to
   (1) $10^0$ m (3) $10^2$ m
   (2) $10^1$ m (4) $10^3$ m

3. What is the approximate mass of an automobile?
   (1) $10^1$ kg (3) $10^3$ kg
   (2) $10^2$ kg (4) $10^6$ kg

4. Velocity is to speed as displacement is to
   (1) acceleration (3) momentum
   (2) time (4) distance

5. The average speed of a plane was 600 kilometers per hour. How long did it take the plane to travel 120 kilometers?
   (1) 0.2 hour (3) 0.7 hour
   (2) 0.5 hour (4) 5 hours

6. A car travels 90. meters due north in 15 seconds. Then the car turns around and travels 40. meters due south in 5.0 seconds. What is the magnitude of the average velocity of the car during this 20.-second interval?
   (1) 2.5 m/s (3) 6.5 m/s
   (2) 5.0 m/s (4) 7.0 m/s

7. A person observes a fireworks display from a safe distance of 0.750 kilometer. Assuming that sound travels at 340. meters per second in air, what is the time between the person seeing and hearing the fireworks explosion?
   (1) 0.453 s
   (2) 2.21 s
   (3) 410. s
   (4) $2.55 \times 10^5$ s

8. A roller coaster, traveling with an initial speed of 15 meters per second, decelerates uniformly at −7.0 meters per second$^2$ to a full stop. Approximately how far does the roller coaster travel during its deceleration?
   (1) 1.0 m (3) 16 m
   (2) 2.0 m (4) 32 m

9. A runner starts from rest and accelerates uniformly to a speed of 8.0 meters per second in 4.0 seconds. The magnitude of the acceleration of the runner is
   (1) 0.50 m/s$^2$ (3) 9.8 m/s$^2$
   (2) 2.0 m/s$^2$ (4) 32 m/s$^2$

10. A car increases its speed from 9.6 meters per second to 11.2 meters per second in 4.0 seconds. The average acceleration of the car during this 4.0-second interval is
    (1) 0.40 m/s$^2$ (3) 2.8 m/s$^2$
    (2) 2.4 m/s$^2$ (4) 5.2 m/s$^2$

11. A car initially traveling at a speed of 16 meters per second accelerates uniformly to a speed of 20. meters per second over a distance of 36 meters. What is the magnitude of the car's acceleration?
    (1) 0.11 m/s$^2$ (3) 0.22 m/s$^2$
    (2) 2.0 m/s$^2$ (4) 9.0 m/s$^2$

12. A cart moving across a level surface accelerates uniformly at 1.0 meter per second$^2$ for 2.0 seconds. What additional information is required to determine the distance traveled by the cart during this 2.0-second interval?
    1 coefficient of friction between the cart and the surface
    2 mass of the cart
    3 net force acting on the cart
    4 initial velocity of the cart

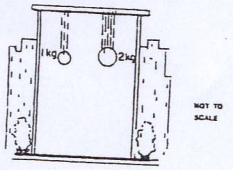
13. A skater increases her speed uniformly from 2.0 meters per second to 7.0 meters per second over a distance of 12 meters. The magnitude of her acceleration as she travels this 12 meters is
    (1) 1.9 m/s$^2$ (3) 2.4 m/s$^2$
    (2) 2.2 m/s$^2$ (4) 3.8 m/s$^2$

14. An object dropped from rest will have a velocity of approximately 30. meters per second at the end of
    (1) 1.0 s (3) 3.0 s
    (2) 2.0 s (4) 4.0 s

15. A freely falling object near the Earth's surface travels downward at a constant
    (1) acceleration of 1.00 m/s$^2$
    (2) acceleration of 9.81 m/s$^2$
    (3) velocity of 1.00 m/s
    (4) velocity of 9.81 m/s

16. A rock dropped off a bridge takes 5 seconds to hit the water. Approximately what was the bridge height?
    (1) 5 m (3) 50 m
    (2) 2 m (4) 125 m

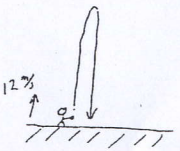
17. Base your answer to the following question on the diagram below which shows a 1-kilogram mass and a 2-kilogram mass being dropped from a building 100 meters high. (Ignore air resistance)




    Halfway down, the acceleration is
    (1) greater for the 1-kilogram mass
    (2) greater for the 2-kilogram mass
    (3) the same for both masses

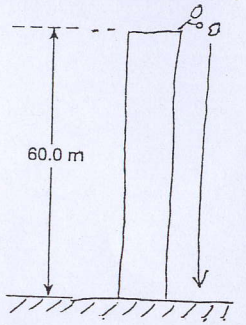
18. An object is dropped from rest and falls freely 20. meters to Earth. When is the speed of the object 9.8 meters per second?
    (1) during the entire first second of its fall
    (2) at the end of its first second of fall
    (3) during its entire time of fall
    (4) after it has fallen 9.8 meters

19. A ball is thrown straight up with a speed of 12 meters per second near the surface of Earth. What is the maximum height reached by the ball? [Neglect air friction.]
    (1) 15 m (3) 1.2 m
    (2) 7.3 m (4) 0.37 m




20 to 22 Base your answers to question 56 through 58 on the information and diagram below.

A ball is dropped from the top of a tower 60.0 meters high.




20. 56 What is the initial velocity of the ball?
    (1) 0 m/s (3) 20.0 m/s
    (2) 9.81 m/s (4) 60.0 m/s

21. 57 What is the approximate total time required for the ball to reach the ground? [Neglect air resistance.]
    (1) 12.2 s (3) 3.00 s
    (2) 2.04 s (4) 3.50 s

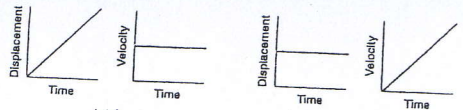
22. 58 What is the velocity of the ball just before it reaches the ground? [Neglect air resistance.]
    (1) 9.81 m/s (3) 34.3 m/s
    (2) 20.0 m/s (4) 68.6 m/s

23. What is the speed of a 2.5-kilogram mass after it has fallen freely from rest through a distance of 12 meters?
    (1) 4.8 m/s (3) 30. m/s
    (2) 15 m/s (4) 43 m/s

24. A ball thrown vertically upward reaches a maximum height of 30. meters above the surface of Earth. At its maximum height, the speed of the ball is
    (1) 0.0 m/s (3) 9.8 m/s
    (2) 3.1 m/s (4) 24 m/s

25. An astronaut standing on a platform on the Moon drops a hammer. If the hammer falls 6.0 meters vertically in 2.7 seconds, what is its acceleration?
    (1) 1.6 m/s$^2$ (3) 4.4 m/s$^2$
    (2) 2.2 m/s$^2$ (4) 9.8 m/s$^2$

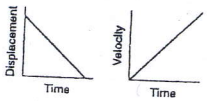
26 ... graphs represent the same motion?



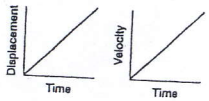
(1)



(3)

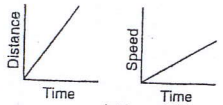


(2)

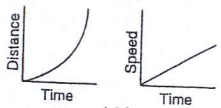


(4)

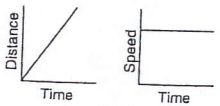
27 Which two graphs represent the motion of an object on which the net force is zero?



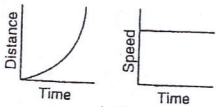
(1)



(3)

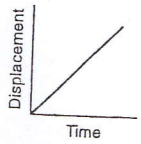


(2)



(4)

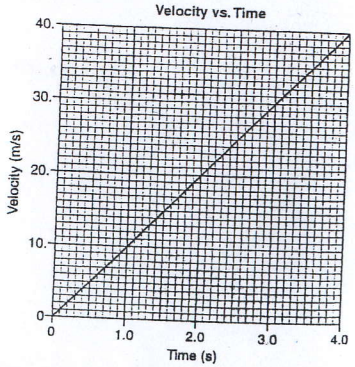
28 The graph below represents the motion of an object.




According to the graph, as time increases, the velocity of the object

1 decreases
2 increases
3 remains the same

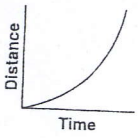
29 The graph below shows the velocity of a race car moving along a straight line as a function of time.



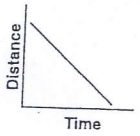

What is the magnitude of the displacement of the car from $t = 2.0$ seconds to $t = 4.0$ seconds?

(1) 20. m
(2) 40. m
(3) 60. m
(4) 80. m

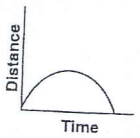
30 A cart travels with a constant nonzero acceleration along a straight line. Which graph best represents the relationship between the distance the cart travels and time of travel?



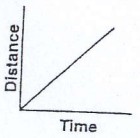
(1)



(2)

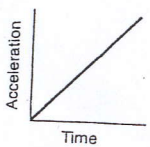


(3)

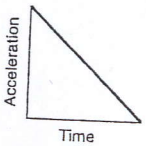


(4)

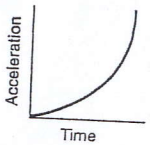
31 Which graph represents acceleration vs. time for a dropped object? (Ignore air resistance)



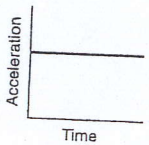
(1)



(2)

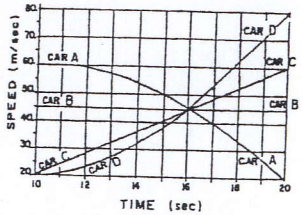


(3)



(4)

Base your answers to questions 61 through 65 on the accompanying graph which represents the motions of four cars on a straight road.




61 The speed of car $C$ at time $t = 20$ seconds is closest to

(1) 60 m/sec
(2) 45 m/sec
(3) 3.0 m/sec
(4) 600 m/sec

62 Which car has zero acceleration?

(1) $A$
(2) $B$
(3) $C$
(4) $D$

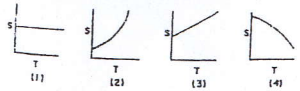
63 Which car is decelerating?

(1) $A$
(2) $B$
(3) $C$
(4) $D$

64 Which car moves the greatest distance in the time interval $t = 10$ seconds to $t = 16$ seconds?

(1) $A$
(2) $B$
(3) $C$
(4) $D$

65 Which graph best represents the relationship between distance and time for car $C$?



## Make Up problem

1982B1. The first meters of a 100-meter dash are covered in 2 seconds by a sprinter who starts from rest and accelerates with a constant acceleration. The remaining 90 meters are run with the same velocity the sprinter had after 2 seconds.

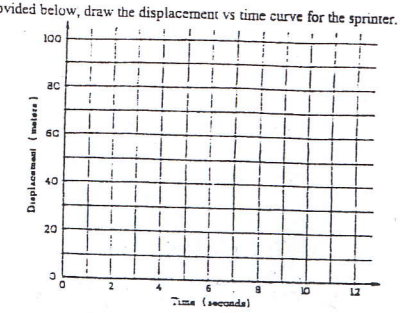
a. Determine the sprinter's constant acceleration during the first 2 seconds.
(show Eqn., sub, & units) [2]

b. What should the distance vs time graph look like for the 1st 2 seconds [1]

c. Determine the sprinters velocity after 2 seconds have elapsed.
(show Eqn. sub & units) [2]

d. Determine the total time needed to run the full 100 meters.
[2]

c.) On the axes provided below, draw the displacement vs time curve for the sprinter.
[3]




## Problem 1

Base your answers to questions 56 and 57 on the information below.

A car traveling at a speed of 13 meters per second accelerates uniformly to a speed of 25 meters per second in 5.0 seconds.

56 Calculate the magnitude of the acceleration of the car during this 5.0-second time interval. [Show all work, including the equation and substitution with units.] [2]

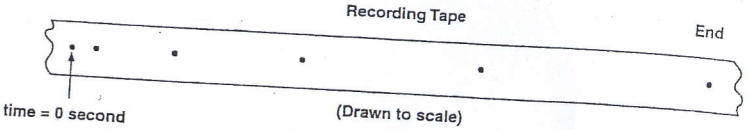
57 Calculate the distance the ca
in this 13 seconds [1]

57 A truck traveling at a constant speed covers the same total distance as the car in the same 5.0-second time interval. Determine the speed of the truck. [1]

## Problem 2

Base your answers to questions 63 through 66 on the information and diagram below.

A spark timer is used to record the position of a lab cart accelerating uniformly from rest. Each 0.10 second, the timer marks a dot on a recording tape to indicate the position of the cart at that instant, as shown.




63 Using a metric ruler, measure the distance the cart traveled during the interval $t = 0$ second to $t = 0.30$ second. Record your answer *in your answer booklet*, to the *nearest tenth of a centimeter.* [1]

64 Calculate the magnitude of the acceleration of the cart during the time interval $t = 0$ second to $t = 0.30$ second. [Show all work, including the equation and substitution with units.] [2]

65 Calculate the average speed of the cart during the time interval $t = 0$ second to $t = 0.30$ second. [Show all work, including the equation and substitution with units.] [2]

66 On the diagram *in your answer booklet*, mark *at least four* dots to indicate the position of a cart traveling at a constant velocity. [1]

63)

65)

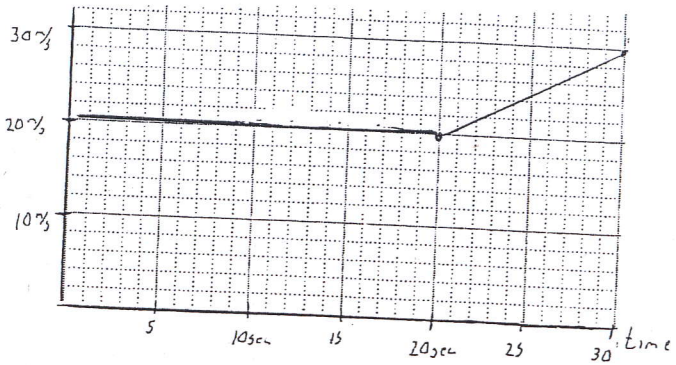
64)

66)

Diagram for Constant Velo

Problem 3

An observer watches a car pass by him and measures its velocity for a time Of 30 seconds. He then plots the data on the Velocity vs. time graph shown Below.




A - What type of motion does the car have from - (motionless, steady speed, accel.) [2]

0 to 20 - _____ 20 to 30 - _____

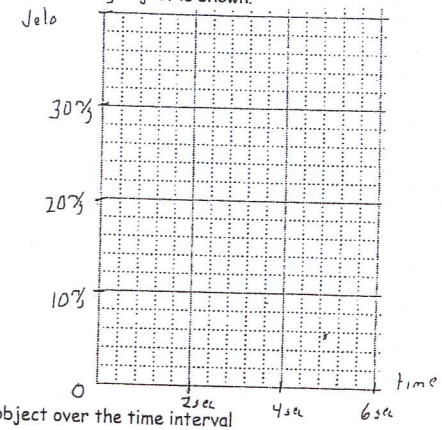
B- Find the cars acceleration from 20 to 30 seconds
(Show equation with substitution & units) [2]

C - Find the distance the car travels from 0 to 20 seconds
(Show equation with substitution & units) [2]

Problem 4

The data table of velocity & time for a moving object is shown.

| Velo | time |
|---|---|
| 5 m/s | 1 sec |
| 9 m/s | 2 sec |
| 18 m/s | 3 sec |
| 20 m/s | 4 sec |
| 24 m/s | 5 sec |
| 32 m/s | 6 sec |




A- Plot the data points [1]
B- Draw the Best fit line [1]

C- Find the acceleration of the object over the time interval
(Show Equation, Sub., & units) [2]

D- Find the cars distance traveled over the time interval
(Show Equation, Sub., & units) [2]