Questions

(A) Write the scientific term for each of the following:

1- The change of object's position as time passes. (…………………)

2- The physical quantity that is used to describe and measure the movement of objects. (…………………)

3- The distance covered through a unit time. (…………………)

4- The change of object's position by equal distances at equal time intervals. (…………………)

5- The change of object's position by unequal distances at equal time intervals. (…………………)

6- The total distance covered by the moving object divided by the total time taken to cover this distance. (…………………)

7- The speed of a moving object relative to the observer. (…………………)

8- The change of an object's speed in one second. (…………………)

9- The change of object's speed by equal values through equal time intervals. (…………………)

10- The physical quantity that has magnitude only. (…………………)

11- The physical quantity that has magnitude and direction. (…………………)

12- The actual length of the path that a moving object takes from the start point to the end point. (…………………)

13- The length of the shortest straight line between two positions (primary and final position). (…………………)

14- The distance covered by the object in a certain direction. (…………………)

(B) Give reason for:

1- Train motion is considered from the motion in one direction.

2- The object's speed increases as time decreases to cover the same distance.

3- It is difficult to measure regular speed practically.

4- The moving car seems stable to an observer moves with the same speed and direction.

5- Length & time are scalar physical quantities.

6- Force & displacement are vector physical quantities.

7- Pilots take in consideration the velocity of the wind.

(C) What is meant by:

1- A train covers a distance 150 km in 2 hours.

2- A car moves with uniform speed 120 km/h.

3- The speed of a car equals zero.

4- The average speed of a moving car is 40 km/h.

5- An object moves with acceleration = 5 m/s^2

6- A body moves with negative acceleration equal = -2 m/s^2.

7- A car moves at uniform acceleration = 10 m/s^2.

8- The displacement of Alexandria from Cairo is 200 km. in western north direction.

9- Average velocity of a moving car is 60 km/h.

(D) Which of the following graphs represents the movement of an object at :

1- Uniform speed.

2- Non-uniform speed.

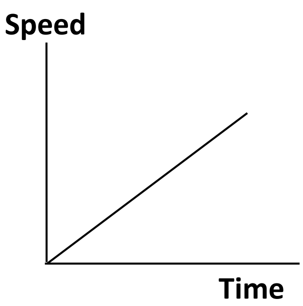
3- Uniform acceleration.

4- Increasing acceleration

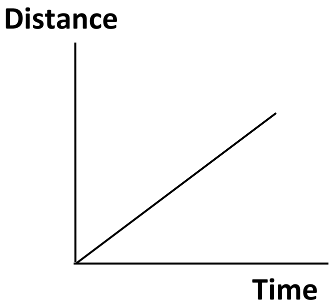
5- Decreasing acceleration.

6- Zero acceleration.

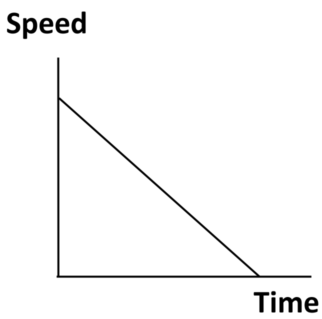
7- Rest.



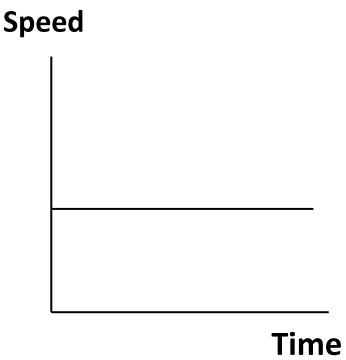
(A)



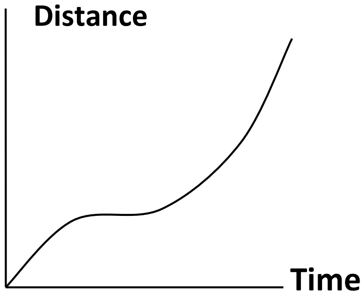
(B)



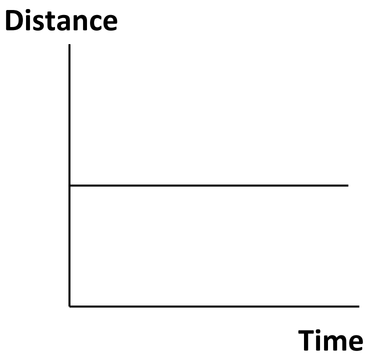
(C)



(D)



(E)



(F)

(E) Problems

1) A racer covered a distance of 100 meter in 10 sec. in a straight line then he returned back walking in 80 sec. calculate the racer's speed while running , while returning back and during the whole trip.

2) Two cars move in the same direction car (A) moves at speed 30 Km/h and car (B) moves at speed 80 Km/ h , while car (C) moves in the opposite direction at speed 40 Km/h calculate the relative speed of car (B) relative to an observer

   1- Stand on the ground. 2- in car (A). 3- in car (C)

3) A train travels from Cairo to Alexandria a distance of 250 km in 2 hours find it's Speed.

4) A Boeing Plane moved from Aswan to Cairo in one hour it Covers a distance of 1000km. Calculate the reading of The Speedometer by (km/h & m/s) if you know that the Plane moves with regular Speed.

5) Two trains move parallel to each other but in opposite direction, the speed of the first train 60 km/h and the second is 90 km/h Calculate The relative speed of the first that observed by passengers in the second train.

6) If a bus moves on a straight line, it's speed change from 8 m/s. to 20 m/s. within a period of 3 sec. What is the amount of acceleration?

7) Within 2.5 sec. the speed of a car reached 65 m/s with acceleration 2 m/s^2 calculate the initial speed of the car.

8) car moves at speed 60 m/s , then the driver used the break to stop the car through 20 sec. calculate the acceleration with which the car moves and mention its type?

9) if an object moves from rest regularly until its speed reaches 10 m/s after 2 sec. from the start of moving, therefore :

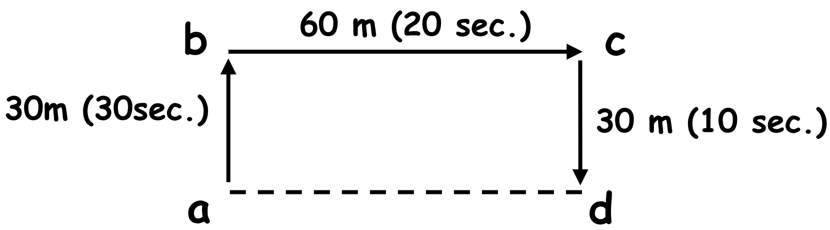
a) The change of speed through the two seconds =…………..m/s

b) The change of speed through one second =……………..m/s

c) Acceleration =……………m/s^2.

10) If a body starts its motion from point (a) covered 30 m. northward till point (b) within 30 sec, then 60 m. eastward till point (c) within 20 sec. then 30 m south world till point (d) within 10 sec. as shown in the figure calculate:

- The total distance.
- The total time.
- The displacement.
- The average speed & average velocity of the body.



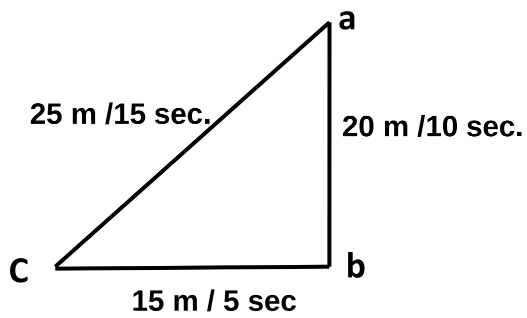
11) If a body moves from the point (a) to the point (c) passing by the point (b) then returning back to (C) as shown in the figure calculate:-

1- The distance covered by the body.

2- The displacement done by the body.

3- The average speed.

4- The average velocity.



12) If the measure of the angle between the incident ray & reflected ray is 140, find the angle of incidence and the angle of reflection? What is the relation between them?

13) A person stands infront of a plane mirror at a distance of 10 meters. What is the distance he must move so that the distance between him and his image becomes 6 meters?

14) Find the focal length of a concave mirror that its diameter is 20 cm.

Model Answers

A) Write the scientific term:

1- motion
2- speed
3- speed
4- uniform "regular" speed
5- Non-uniform "irregular" speed.
6- Average speed
7- relative speed
8- Acceleration
9- Uniform acceleration
10- Scalar physical quantity
11- vector physical quantity
12- Distance
13- Displacement
14- Displacement

(B) Give reason:

1- Because train moves in straight line forward or backward but it doesn't move upward or downward.

2- Because speed = $\frac{distance}{time}$, so speed is directly proportional to the distance.

3- Because car's speed changes according to traffics.

4- Because relative speed equals zero.

5- Because they have magnitude only & have no direction.

6- Because they have magnitude & direction.

7- Because when the plane flies against the wind direction, it consumes more fuel than when it flies in same direction of wind.

(C) What is meant by:

1- The speed of the train is 75 km/h.

2- The car covers 120 km every one hour.

3- The car is at rest.

4- The total distance covered by the car divided by the total time taken to cover this distance equals 40.

5- The body's speed increases by 5 m/sec. each one second.

6- The body's speed decreases by 2 m/s each one second.

7- The body's speed changes with (10 m/s) equal values through equal periods of time.

8- The length of shortest straight line between Alexandria & Cairo in western north direction equals 200 km.

9- The rate of change of displacement of the car is 60 km/h.

(D)

1- (B), (D)	2- (E)	3- (A)
4- (A)	5- (C)	6- (D)
7- (F)		

(E) Problems

1) V (while returning) = $\frac{d}{t} = \frac{100}{10}$ = 10 m/s

V (while walking) = $\frac{d}{t} = \frac{100}{80}$ = 1.25 m/s

$\overline{\text{V}} = \frac{100+100}{10+80}$ = 2.2 m/s

2) 1- relative speed = 80 km/h

2- relative speed = 80 – 30 = 50 km/h.

3- relative speed = 80 + 40 = 120 km/h.

3) $V = \frac{d}{t} = \frac{250}{2}$ = 125 km/h.

4) **Speed** $= \frac{d}{t} = \frac{1000}{1}$ = 1000 km/h.

$= 1000 \times \frac{1000}{60\times60}$ = 277.7 m/s

5) **Relative speed** = 90 + 60 = 150 km/h

6) **a =** $\frac{final\ speed - initial\ speed}{t}$

$= \frac{20-8}{3} = 4$ m/s^2

7) t = 2.5 sec. v_2 = 65 m/s , a = 2 m/s^2

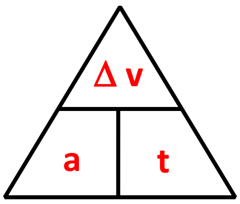
Δ v = a x t

= 2.5 × 2 = 5 m/s

$\Delta v = v_2 - v_1$

$v_1 = v_2 - \Delta v$

= 65 – 5 = 60 m/s



8) **V_1 = 60 m/s , V_2 = 0 , t = 20 sec.**

$a = \frac{v_2 - v_1}{t} = \frac{0-60}{20} = -3$ m/s^2 (-ve acceleration or deceleration)

9) $V_1 = 0$, $V_2 = 10$ m/s , t = 2 sec.

a) $\Delta v = v_2 - v_1 = 10 - 0 = 10$ m/s

b) $\Delta v = 5$ m/s

c) $a = \frac{10-0}{2} = 5$ m/s^2

10)

- Total distance = 30 + 60 + 30 = 120 m
- Total time = 60 sec.
- Displacement = 60 m in east ward direction
- $\bar{V}$ (average speed) = $\frac{total\ distance}{total\ time} = \frac{120}{60}$ = 2m/s
- Average velocity = $\frac{total\ displacement}{total\ time}$

$= \frac{60}{60}$ = 1m/s in east ward direction

11) 1- distance = 20 + 15 = 35 m

2- displacement = 25 m in direction $\overrightarrow{AC}$

3- Average speed = $\frac{total\ distance}{time}$

$= \frac{35}{15}$ = 2.3 m/s

4- Average velocity = $\frac{total\ displacement}{time}$

$= \frac{25}{15}$ = 1.6 m/s in direction $\overrightarrow{AC}$

12) = 70^{o}

Incidence angle = reflect angle

13) 7 meter

14) diameter = 20 cm

radius = $\frac{20}{2}$ = 10 cm

So focal length = $\frac{radius}{2} = \frac{10}{2}$ = 5 cm