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1. An object has moved through a distance. Can it have zero displacement? If yes, support your answer with an example.
Answer: Yes, an object can have zero displacement even when it has moved through a distance.This happens when final position of the object coincides with its initial position. For example,if a person moves around park and stands on place from where he started then here displacement will be zero.

2. A farmer moves along the boundary of a square field of side 10 m in 40 s. What will be the magnitude of displacement of the farmer at the end of 2 minutes 20 seconds from his initial position?
Answer:
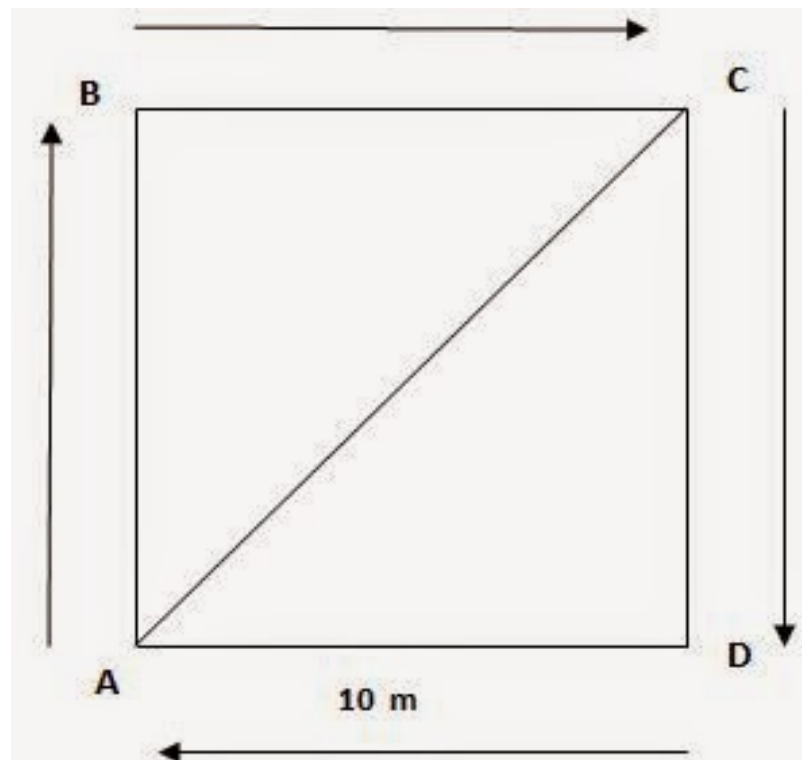
Given, Side of the square field = 10m
Therefore, perimeter = 10 m × 4 = 40 m
Farmer moves along the boundary in 40s.
Displacement after 2 m 20 s = 2 × 60 s + 20 s = 140 s =?
Since in 40 s farmer moves 40 m
Therefore, in 1s distance covered by farmer = 40 / 40 m = 1m
Therefore, in 140s distance covered by farmer = 1 × 140 m = 140 m.
Now, number of rotation to cover 140 along the boundary= Total Distance / Perimeter
= 140 m /40 m = 3.5 round

Thus, after 3.5 round farmer will at point C of the field.

$$\text{Therefore. Displacement } AC = \sqrt{(10m)^2 + (10m)^2}$$
$$= \sqrt{100m^2 + 100m^2}$$
$$= \sqrt{200m^2}$$
$$= 10\sqrt{2}\ m$$
$$= 10 \times 1.414 = 14.14\ m$$

Thus, after 2 min 20 seconds the displacement of farmer will be equal to 14.14 m north east from intial position.

3. Which of the following is true for displacement?
(a) It cannot be zero.
(b) Its magnitude is greater than the distance travelled by the object.
Answer: None of the statement is true for displacement First statement is false because displacement can be zero. Second statement is also false because displacement is less than or equal to the distance travelled by the object.

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1. Distinguish between speed and velocity.
Answer:

Speed	Velocity
Speed is the distance travelled by an object in a given interval of time.	Velocity is the displacement of an object in a given interval of time.
Speed = distance / time	Velocity = displacement / time
Speed is scalar quantity i.e. it has only magnitude.	Velocity is vector quantity i.e. it has both magnitude as well as direction.

2. Under what condition(s) is the magnitude of average velocity of an object equal to its average speed?
Answer: The magnitude of average velocity of an object is equal to its average speed, only when an object is moving in a straight line.

3. What does the odometer of an automobile measure?
Answer: The odometer of an automobile measures the distance covered by an automobile.

4. What does the path of an object look like when it is in uniform motion?
Answer: An object having uniform motion has a straight line path.

5. During an experiment, a signal from a spaceship reached the ground station in five minutes. What was the distance of the spaceship from the ground station? The signal travels at the speed of light, that is, 3 × 108 m s-1.
Answer: Speed$= 3 \times 10^8$ m s^{-1}
Time$= 5$ min $= 5 \times 60 = 300$ secs.
Distance$=$ Speed $\times$ Time
Distance$= 3 \times 10^8$ m s$^{-1} \times 300$ secs. $= 9 \times 10^{10}$ m

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1. When will you say a body is in (i) uniform acceleration? (ii) non-uniform acceleration?
Answer: (i) A body is said to be in uniform acceleration if it travels in a straight line and its velocity increases or decreases by equal amounts in equal intervals of time.
(ii) A body is said to be in nonuniform acceleration if the rate of change of its velocity is not constant.

2. A bus decreases its speed from 80 km h^{-1} to 60 km h^{-1} in 5 s. Find the acceleration of the bus.
Answer:

Initial speed of the bus, u= 80 km/h $\quad = 80 \times \dfrac{5}{18} = 22.22 \ \text{m/s}$

Final speed of the bus, v= 60 km/h $\quad = 60 \times \dfrac{5}{18} = 16.66 \ \text{m/s}$

Time take to decrease the speed, t= 5 s

Acceleration, $a = \dfrac{v-u}{t} = \dfrac{16.66 - 22.22}{5} = -1.112 \ \text{m/s}^2$

3. A train starting from a railway station and moving with uniform acceleration attains a speed 40 km h^{-1} in 10 minutes. Find its acceleration.
Answer:

Initial velocity of the train, u= 0

Final velocity of the train, v= 40 km/h $\quad = 40 \times \dfrac{5}{18} = 11.11 \ \text{m/s}$

Time taken, t = 10 min = 10 x 60 = 600 s

Acceleration, $a = \dfrac{v-u}{t} = \dfrac{11.11-0}{600} = 0.0185 \ \text{m/s}^2$

Hence, the acceleration of the train is 0.0185 m/s².

********** END *********