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CLASS - IX SUB - PHYSICS (SCIENCE)

CHAPTER - 1 (MOTION)

1. What is meant by Rest?

Ans: A body is said to be at rest, if it does not change its position with respect to a fixed point in the surroundings.
For Ex- a book lying on the table.

2. What is meant by Motion?

Ans: A body is said to be in motion when its position changes continuously with respect to a fixed point in its surroundings.
For Ex- Cars and buses running on the road.

Motion can be various types, like linear motion, rotational motion, vibrational motion or a combination of more than one type of motion.

Remark

The common characteristics of all the moving bodies is that they change their positions with time and with respect to some reference point.

3. What is meant by Physical Quantities?

Ans: The quantities which can be measured directly or indirectly are called physical quantities. For Ex- Length, mass, velocity, force.

4. What are scalar quantity?

Ans: The quantity whose complete specifications requires magnitude only are called scalar quantities. For Ex- if we say that the mass of a cement bag is 50kg, (Mass), distance, speed, work, volume, density, electric potential etc.

5. What are vector quantities?

Ans: The quantities whose complete specification requires the magnitude and direction both are called vector quantities.

For Ex- Momentum, Force, displacement, etc.

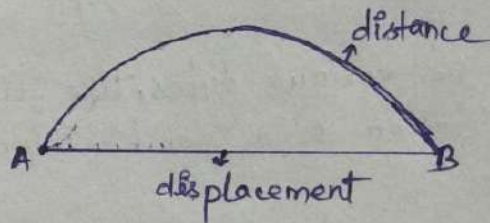
6. What is distance?

Ans: Distance is the length of actual path traversed. Distance is a scalar quantity, since it requires the statement of length only without specification of direction. Its unit is meter (m).

7. What is meant by displacement?

Ans: The shortest or perpendicular distance between the initial point and final point is called displacement. It is a vector quantity. Its unit is meter (m).

Remark- i



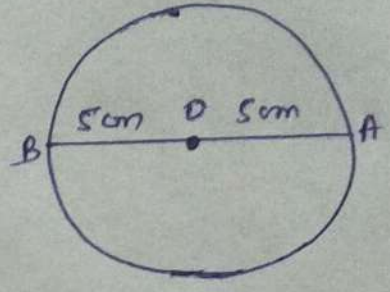
ii Displacement of a body may be positive, negative or zero.

8. Write the difference between distance and displacement.

Ans:	Distance	Displacement
i)	Distance is the length of the actual path travelled by a body in a given time.	Displacement is the shortest distance between the initial and final positions of the moving body in a known direction.
ii)	Distance travelled by a body is always positive.	Displacement of a body may be positive, zero or negative.
iii)	Distance is a scalar quantity.	Displacement is a vector quantity.
iv)	Distance travelled by a body is always greater or equal to its displacement in any direction.	Displacement of a body is always less than or equal to distance travelled by the body.

Q.1) A particle moves in a circle with O as centre and $AO = OB = 5\text{ cm}$ as radius, as shown in the figure. It starts from A. Calculate:

- i) the distance covered, and
- ii) the displacement, when it reaches B.



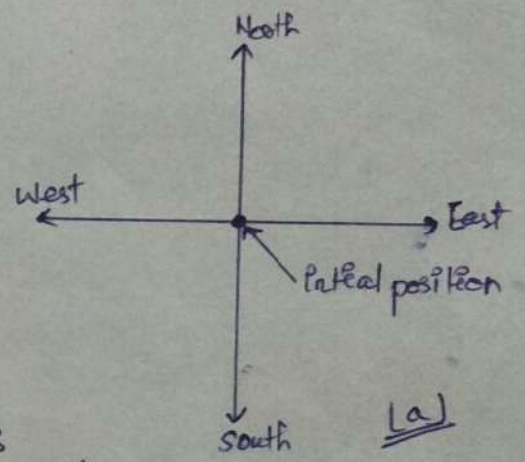
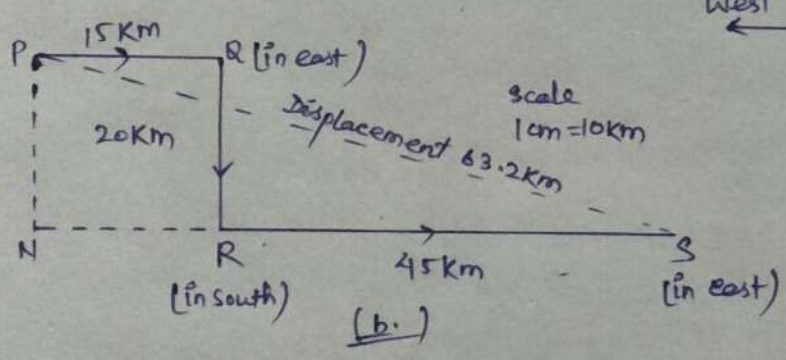
Ans: i) Distance covered = $\pi \times OA$
 $= \pi \times 5 = 5\pi \text{ cm}$

ii) Displacement = $2 \times OB$
 $= 2 \times 5 = 10 \text{ cm along AB}$

Q. A car travels a distance of 15 km towards east, 20 km towards south and then 45 km towards east. Show the motion of the car graphically and determine:

- i) the total distance travelled by the car
- ii) the displacement of the car.

Ans: i) Total distance travelled by the car = $15 + 20 + 45 = 80 \text{ km}$.

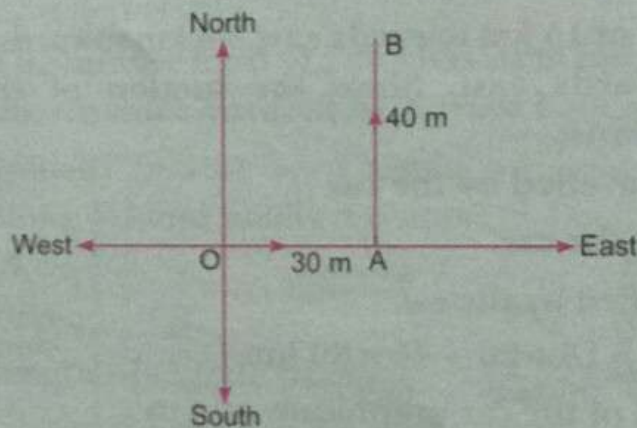


ii) Resultant displacement = PS
 $= \sqrt{PN^2 + NS^2}$
 $= \sqrt{400 + 3600} = 63.2$

Hence, the resultant displacement is 63.2 km.

Practice Questions

1. If the displacement of a body is zero, is it necessary that the distance covered by it is also zero?
2. Can the displacement be greater than the distance travelled by an object?
3. When do the distance and displacement of a moving object have the same magnitude?
4. Prachi travels a distance of 30 m towards east, then she turns towards north and travels 40 m in that direction as shown in figure.



- (i) Find the distance travelled from O to B .
 - (ii) Find the displacement from O to B .
5. Define distance and displacement. A body covers one complete revolution around a circular park of circumference 176 m in 4 minutes. Find the displacement of the body after 6 minutes.
 6. A particle is moving in a circle as shown in figure.
 - (i) What is the distance travelled by the particle from P to R ?
 - (ii) What is the distance travelled by the particle from P to P ?
 - (iii) Find the displacement from R to P .
 - (iv) Find the displacement from R to R .

