



Grade IX – PHYSICS

CHAPTER 8 - MOTION

1. An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 min 20 s?
Answer - Athlete will cover a distance = 200m

2. Joseph jogs from one end A to the other end B of a straight 300 m road in 2 min 30 s and then turns around and jogs 100 m back to point C in another 1 min. What are Joseph's average speeds and velocities in jogging
(a) From A to B and (b) from A to C?

Ans-

(a) Average speed = $300/150 = 2 \text{ m/s}$

Average velocity = $300/150 = 2 \text{ m/s}$

(b) From end A to end C

Average speed = $400/210 = 1.90 \text{ m/s}$

Average velocity = $200/210 = 0.95 \text{ m/s}$

3. What is a reference point ?

Ans- A fixed point with respect to which the given object changes its position.

4. Is it possible that the train in which you are sitting appears to move while it is at rest ?

Ans-Yes. The train at rest in which we are sitting appears to move when we look at another train moving parallel to the track on which our train is standing.

5. Define the term "distance"

Ans -The length of actual path travelled by an object in the given time is called the distance travelled by the object.

6. Define the term "displacement".

Ans-The shortest distance between the initial and final positions of the object in a particular direction.

7. Is displacement of an object a scalar or a vector quantity?

Ans- Displacement is a vector quantity.

8. Under what condition is distance and the magnitude of the displacement equal ?
Ans- Distance and magnitude of the displacement are equal if an object moves along a straight line in one direction.

9. A particle is moving in a circle of diameter 5 m. What is its displacement when it completes 1 revolutions ?

Ans -After 1 revolution, particle is diametrically opposite to its initial position.
Therefore, its displacement = diameter of the circle = 5 m.

10. What do you mean by uniform motion ?

Ans -The motion of an object is uniform motion if it travels equal distances in equal intervals of time along a straight line

11. What is the shape of the path of a body when it is in uniform motion ?

Ans -Straight line.

12. Define the term "speed".

Ans -The distance travelled by an object per unit time is known as speed of the object.

13. Define average speed.

Ans -Average speed is the ratio of the total distance travelled by an object to the total time taken by it.

14. What does speedometer of an automobile measure ?

Ans -Speedometer of a vehicle measures its instantaneous speed.

15. Define the term "velocity".

Ans -Velocity is defined as the ratio of the displacement of an object to the time taken by it.

16. Give one example of positive acceleration.

Ans -The acceleration of a body is positive, when it falls from certain height.

17. What do you mean by negative acceleration ?

Ans -When the change in velocity of a body takes place in a direction opposite to the direction of motion of the body, then the acceleration is negative.

18. If the displacement-time graph for a particle is parallel to time axis, how much is the velocity of the particle.

Ans -Velocity is zero as there is no change in displacement with time.

19. What does the slope of a velocity-time graph represent?

Ans -It represents the acceleration of the body.

20. Name the physical quantity measured by the area occupied below velocity-time graph for uniform motion

Ans -Magnitude of displacement of the body = area under v-t graph

21. Define uniform velocity and uniform acceleration?

Ans. Uniform velocity \Rightarrow A body is said to move with uniform velocity if equal displacement takes place in equal intervals of time, however small these intervals may be.

Uniform acceleration \Rightarrow A body is said to move with uniform acceleration if equal changes in velocity takes place in equal intervals of time, however small intervals

may be.

22. The velocity time graph of two bodies A and B traveling along the +x direction are given in the figure



- (a) Are the bodies moving with uniform acceleration?
(b) Which body is moving with greater acceleration A or B?

Ans. (a) Yes the bodies are moving with uniform acceleration.
(b) The body A is moving with greater acceleration.

23. An object has moved through a distance. Can it have zero displacement? If yes, support your answer with an example.

Ans. Yes, if an object has moved through a distance it can have zero displacement because displacement of an object is the actual change in its position when it moves from one position to the other. So if an object travels from point A to B and then returns back to point A again, the total displacement is zero.

Therefore speed = $3500 / 720 = 4.861 \text{ m/s}$

Speed of A = 4.861 m/s

d) Speed of B = Distance covered / Time taken
= $3000 / 720 = 4.16 \text{ m/s}$

e) X on the graph represents the point at which both A and B are at the same position

24. State which of the following situations are possible and give an example for each of these:

a. An object with a constant acceleration but with zero velocity . b. An object moving in a certain direction with acceleration in the perpendicular direction.

Ans -a) An object with a constant acceleration can still have the zero velocity. For example, an object which is at rest on the surface of earth will have zero velocity but still being acted upon by the gravitational force of earth with an acceleration of 9.81 m/s^2 towards the centre of earth. Hence when an object starts falling freely can have constant acceleration but with zero velocity.

b). When an athlete moves with a velocity of constant magnitude along the circular path, the only change in his velocity is due to the change in the direction of motion. Here, the motion of the athlete moving along a circular path is, therefore, an example of an accelerated motion where acceleration is always perpendicular to direction of motion of an object at a given instance. Hence it is possible when an object moves on a circular path.