

Motion

class - 7.

classmate

Date _____

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Q.1] Explain the meaning of the terms rest and motion.

⇒ A body is said to be at rest if it does not change its position with respect to a fixed point in its surroundings.

When the position of a body with respect to its surroundings changes with time, a body is said to be in motion.

2.] Comment on the statement 'rest and motion are relative terms'. Give an example.

⇒ An object can be in motion relative to one set of objects while at rest relative to some other sets of objects. Thus, rest and motion are relative.

Example:- When we are sitting in a room, we are at rest in relation to all other stationary objects inside the room. But the room is on the earth and the earth is not at rest rather it is revolving around the sun. Hence, in relation to the earth, we are in motion.

3.] Fill in the blanks:-

a) A person walking in a compartment of a stationary train is in motion relative to the compartment and is in motion relative to the platform.

b) A person sitting in a compartment of a moving train is at rest relative to other person sitting by his side and is in motion relative to platform.

4.) Name five different types of motion you know.

⇒ They are -

- i.) Translatory motion
- ii.) Periodic motion
- iii.) Circular motion
- iv.) Rotatory motion and
- v.) Oscillatory motion.

5.) What do you mean by translatory motion? Give one example.

⇒ If an object moves in a line in such a way that every point of the object moves through the same distance in the same time, then the motion of the object is called translatory motion.

Example - A train running on straight tracks.

6.) Explain the meanings of i) rectilinear motion, and ii) curvilinear motion. Give an example of each.

⇒ If the motion of a body is along a straight line, it is said to be rectilinear motion.

Example → March past of the soldiers in a parade on a straight road.

If the motion of a body is along a curved path, it is said to be a curvilinear motion.

Example → The motion of a cycle while taking a turn on the road.

7) What is rotatory motion? Give two examples.

⇒ A body is said to be in a rotatory motion if it moves about a fixed axis. Ex - a spinning top, a merry-go-round.

8) What is meant by circular motion? Give one example.

⇒ The motion of a body along a circular path is called circular motion. Here, the distance of a moving object from a fixed point does not change.
Example → The motion of a car around a circular path; the motion of earth around the sun.

9) How does rotatory motion differ from circular motion?

⇒ In rotatory motion the axis of rotation passes from a point in the body itself whereas in circular motion, the axis of revolution passes through a point outside the body.

10) Explain oscillatory motion by giving one example.

⇒ The to and fro motion of a body from its rest position or mean position is called the oscillatory motion. For example, the motion of a swing.

11) What is vibratory motion? Give one example.

⇒ It is a type of motion where a part of the body always remains fixed and the rest part moves to and fro about its mean position. During vibratory motion, the shape and size of the body changes.
Example → The expansion and contraction of our chest while breathing.

12) Differentiate between periodic and non-periodic motions by giving an example of each.

⇒ Periodic motion gets repeated after a regular interval of time but non-periodic motion does not repeat itself after a regular interval of time.

• Ex - The motion of the needle of a sewing machine (periodic motion)

• A footballer running on a field (non-periodic motion).

13) What is random motion? Give an example.

⇒ The motion of a particle or body which does not take a specific path and specific direction of motion is said to be random motion. Ex - the molecules of a liquid or gas.

14) Name the type/types of motion being performed:

i) Vehicle on a straight line - Rectilinear motion (translatory motion).

ii) Blades of an electric fan in motion - Rotatory motion.

iii) Pendulum of a wall clock - Oscillatory motion / periodic motion.

iv) Smoke particles from chimney - Random motion.

v) Hands of a clock - Rotatory motion & periodic motion.

vi) Earth around the sun - Circular motion / periodic motion / rotatory motion.

vii) A spinning top - Rotatory motion.

15) Give two examples to illustrate that a body can have two or more types motion simultaneously.

⇒ i) A carpenter's saw has translatory as well as oscillatory motion as it moves down while oscillating.

ii) A ball rolling on the ground has rotatory motion as well as translatory motion as it moves on the ground.

16) State the types of motion in the following :-

i) The needle of a sewing machine → Oscillatory motion as well as periodic motion.

ii) The wheel of a bicycle → Translatory as well as rotatory motions.

iii) The drill machine - Rotatory as well as translatory motions.

iv) The carpenter's saw - Translatory as well as oscillatory motion.

17) Distinguish between uniform and non-uniform motions, giving one example of each.

⇒ If a moving body travels equal distance in equal intervals of time, its motion is said to be uniform.

Example :- If a car moves 30 km for initial 1 hr and another 30 km for next 1 hr. also, its motion is called uniform.

If a moving body travels unequal distances in equal intervals of time, its motion is said to be non-uniform. Ex - When a car travels 4 km in the first hour, 8 km in the 2nd hour and then 3 km in the last hour.

18) How do you determine the average speed of a body in non-uniform motion?

⇒ The average speed of a body is calculated by finding the ratio of the total distance travelled by the body to the total time taken in the journey, i.e.,

$$\text{Average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}}$$

19) Define the term weight- and state its S.I. unit.

⇒ The weight of a body is the force with which earth attracts the body.

The S.I. unit of weight is newton (N).

20) How are the units of weight kgf and newton related?

⇒ $1 \text{ kgf} = 9.8 \text{ N}$ (i.e., 10N nearly)

21) State three differences between mass and weight.

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22) Which quantity: mass or weight, does not change by change of place?

⇒ Mass (because it does not depend upon the force of attraction of earth like weight).

23) State which quantity mass or weight is always directed vertically downwards.

⇒ Weight.