

Motion ch-2

Home Assignment

1. What do you mean by translatory Motion? Give Example.

Ans) If an object like a vehicle 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.

1. Ex - A running boy, Moving bus.

2. Explain the meanings of (i) rectilinear motion, (ii) curvilinear motion.

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

Ex. A car moving over a curved board.

Curvilinear motion :- If the motion is in a curved path.

Ex - A car moving along a curved path.

Curvilinear Motion :-

If the motion of a body is along a curved path. It is said to be a curvilinear motion. For ex - A car moving along a curved path.

3. What is rotatory motion? Give two examples.

Ans) Rotatory motion - A body is said to be in a Rotatory motion if it moves about a fixed axis.

Ex -

- * The blades of a fan
- * A spinning top

Q. What is meant by circular motion?

Circular motion - The motion of a body along a circular path is called ~~circ~~ circular motion

Ex - A string on a circular path

Motion

1. Rest :- A body is said to be at rest if it ~~does~~ does not change its position with respect to a fixed point in its surroundings.

Ex - A book laying on the table.

When the position of the body with respect to its surrounding ~~also~~ doesn't change with time, the body is said to be at rest.

2. Motion :- When the position of a body with respect to its surrounding changes its position with time is called to be in motion.

Answers

B2. A bus is in motion with respect to a boy sitting on a bench outside the bus but the trees around him appear to be at rest.

But to a boy sitting inside the bus the trees and the boy outside the bus ~~will~~ appear to move in opposite directions and the roof of the bus or the driver of the bus will appear to be at rest.

Hence it is concluded that rest and motion are relative terms.

3a) 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 the other person sitting by his side and is in motion

relative to the platform

40. The ^{of} Name ^{of} the types of motion is :-

Translatory motion, Rotatory motion, Oscillatory motion, vibratory motion, periodic motion

5. Rectilinear motion :- If the motion of a body is along a straight line it is said to be a rectilinear or linear motion.

Ex - A ball falling from a height straight towards the surface of the earth.

Curvilinear motion :- If the motion of a body is along a curved ~~path~~ path it is said to be curvilinear motion. For ex - The ~~motion~~ motion of a cycle while taking a turn ~~at~~ on the road

8. ~~The~~ The motion of a body along a circular path is called circular motion.

Ex - The motion of a satellite around the Earth.

a. Rotatory motion

1. In Rotatory motion the axis of rotation passes ~~to~~ from a point in the body itself.

① The motion of Earth about its own axis is the rotational motion.

Circular motion

In circular motion the axis of revolution passes through a point outside the body.

① The motion of Earth ~~about its~~ around the Sun is the circular motion.

10. The To and fro motion of any body from its rest position is called the oscillatory motion. For example - the motion of the pendulum of a wall clock. In vibratory motion

(1) In vibratory motion a part of the body is always remains fixed and the rest part moves to and fro about its mean position. During the vibratory motion the shape and size of the body changes. Ex - when we breathe our chest expands and contracts.

(2) periodic motion	Non-Periodic motion
1. A motion which gets repeated after regular intervals of time is called a periodic motion. Ex - The Earth completes one revolution around the sun in 365 days and is repeated after every 365 days.	The motion which doesn't after a regular interval of time is called non periodic motion. Ex - A footballer running on a field.

13. When an object in a motion has no specific path and which suddenly changes its motion it's said to have a random motion.
Some ex - A flying kite

14 a) A vehicle on a straight road - Rectilinear motion

b) Blades of an ~~electric~~ electric fan in motion - Rotatory motion

c) pendulum of a wall clock - Oscillatory motion

d) Smoke particles from chimney - non-periodic motion

e) Hands of a ~~clock~~ clock - uniform circular, periodic motion

f) Earth around the sun - circular, Rotatory, periodic motion

g) A spinning top - Rotatory motion

15. Sometimes a body can have more than one type of motion. These motions are called mixed motion.

Ex - The wheels of a moving vehicle such as cycle, car have both translatory as ~~well~~ as well as rotatory motion.
A drill used by a carpenter has both rotatory motion as well as translatory motion.

16. a) The needle of a sewing machine -
Periodic motion

b) The wheels of a bicycle -
Rotatory motion

c) The drill machine - rotatory,
translatory motion

d) The components are - Oscillatory,
translatory motion

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17. Uniform motion

* If a moving body travels equal distance and in equal intervals of time its motion is said to be uniform.
Ex - Movement of blades of a ceiling fan.

non-uniform motion

* If a moving body travels unequal distance in equal intervals of time its motion is said to be non uniform.
Ex - If a car covers 10m in first two seconds and 15m in next two seconds.

18. In a non uniform motion the average speed of a body is calculated by dividing the

$$\text{Average Speed} = \frac{\text{Total distance travelled by body}}{\text{Total time of journey}}$$

19. The weight of a body is the force with which it is attracted towards the body i.e.
The weight of a body is the force of gravity on it.

The weight of a body is not constant but it changes from place to place. It is represented by the symbol W . The S.I unit of weight is Newton (N).

20. $1 \text{ kg F} = 10 \text{ N}$

21. Mass

Weight

① It is the quantity of matter content in a body.

① It is the force with which the earth attracts the body.

② Its S.I unit is kilogram (kg).

② Its S.I unit is Newton (N) and other unit is kgf.

③ It is measured by a beam balance.

③ It is measured by Spring balance.

22. The mass of a body is constant and it doesn't change by changing the position of a body.

23. ~~Mass is~~ weight is the force with

which the Earth attracts the body, weight is always directed vertically downwards

(1) Distance covered = 160 km
Time taken = 4 hrs

$$\begin{aligned}\text{Avg. Speed} &= \frac{\text{Distance covered}}{\text{Time taken}} \\ &= \frac{160 \text{ km}}{4 \text{ hrs}} = 40 \text{ km h}^{-1}\end{aligned}$$

2) Distance travelled = 300 km
Avg. Speed = 60 km h⁻¹

$$\begin{aligned}\text{We know } \text{Avg. Speed} &= \frac{\text{Distance covered}}{\text{Time taken}} \\ \text{Time taken} &= \frac{\text{Distance covered}}{\text{Avg. Speed}}\end{aligned}$$

$$\begin{aligned}&= \frac{300 \text{ km}}{60 \text{ km h}^{-1}} \\ &= 5 \text{ hrs}\end{aligned}$$

$$3. \text{ Avg. Speed} = 10 \text{ m s}^{-1}$$

$$\text{Time taken} = 20 \text{ min} \quad \text{Distance} = ?$$

So we know

$$\text{Avg. speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$

$$\text{Distance travelled} = \text{Avg speed} \times \text{Time taken}$$

$$\text{Distance travelled} = 10 \text{ m s}^{-1} \times 20 \text{ min}$$

$$= \frac{10 \text{ m}}{1 \text{ s}} \times 1200 \text{ Sec}$$

$$= 12000 \text{ m}$$

$$= 12 \text{ km}$$

4.

i) As speed doesn't remain constant throughout the journey & the motion is called non-uniform motion.

ii) The total distance travelled = ~~30m~~ 30m + 30m
= 60m

Total time taken = 1 min + 1.5 min = 2.5 min
= 2.5 × 60 = 150 s

Avg. Speed = $\frac{\text{Total Distance}}{\text{Time Taken}}$

$$= \frac{60 \text{ m}}{150 \text{ s}} = 0.4 \text{ m s}^{-1}$$

5. i) Total distance travelled by the cyclist = 1 km + 0.5 km + 0.3 km
= 1.8 km

Total time taken = 1h + 1h + 1h = 3 hrs

$$\text{Avg. Speed } \text{km h}^{-1} = \frac{\text{Distance covered}}{\text{Time taken}}$$

$$= \frac{1.8 \text{ km}}{3 \text{ hrs}} = 0.6 \text{ km h}^{-1}$$

ii)

$$\text{Total distance} = 1.8 \text{ km}$$

$$= 1.8 \times 1000$$

$$= 1800 \text{ m}$$

$$\text{Total time taken} = 3 \text{ hrs}$$

$$= 3 \times 3600$$

$$= 10800 \text{ s}$$

$$\text{Avg. Speed in } \text{m s}^{-1} = \frac{\text{Distance Travelled}}{\text{Time taken}}$$

$$= \frac{1800 \text{ m}}{10800 \text{ s}}$$

$$= 0.167 \text{ m s}^{-1}$$

6. a) Speed of car in 1 hr = 30 km

Speed of car in 30 min = $30 \div 2 = 15 \text{ km}$

Distance covered in 30 min or 0.5 hr

is = 15 km

Distance covered in 1 hr = 40 km

Total Distance covered = 15 km + 40 km
= 55 km

b) Total time taken = 0.5 hr + 1 hr
= 1.5 hr

c) Avg. Speed = $\frac{\text{Total distance covered}}{\text{Total time}}$

$$= \frac{55 \text{ km}}{1.5 \text{ hr}}$$

$$= 36.67 \text{ km per hr}$$

7. Weight of a body of mass 1.0 kg = 10 N
weight of a bag of mass = 37 kg.
Weight in kgf = 37 kgf.

$$1 \text{ kgf} = 10 \text{ N}$$

$$37 \text{ kgf} = 10 \text{ N} \times 37 = 370 \text{ N}$$

8 a) Mass remains same it does not change

∴ mass of boy 30 kg on earth =
30 kg on moon

b) Weight of boy on moon becomes $\frac{1}{6}$

∴ 30 kg boy will weight
 $30 \times \frac{1}{6} = 5 \text{ kg}$

$$1 \text{ kg} = 10 \text{ N} \Rightarrow 5 \times 10 \text{ N} = 50 \text{ N}$$

∴ Weight of boy on moon surface