CHAPTER – 2 FORCE AND PRESSURE : MOTION [EXERCISE]

A. Choose the correct option :

1. Which of the following types of motion is not exhibited by the earth moving around the sun?
(a) Circular (b) Rotational
(c) Rectilinear (d) Periodic
Answer : (c) Rectilinear

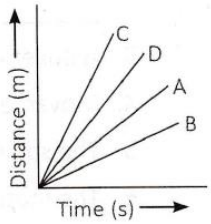
2. Which of the following types of motion are possessed by a merry-go-round at the same time?
(a) Rotational motion, rectilinear motion
(b) Rectilinear motion, curvilinear motion
(c) Circular motion, rotational motion
(d) Oscillatory motion, circular motion
Answer : (c) Circular motion, rotational motion

3. The most appropriate unit for expressing the speed of a space rocket is :
(a) m/s (b) km/s
(c) km/h (d) km/min
Answer : (b) km/s

4. The instrument installed in a car for measuring the distance travelled by the car is called :
(a) barometer (b) speedometer
(c) anemometer (d) odometer
Answer : (d) Odometer

5. Which of the following could not be a unit of speed?
(a) km/h (b) s/m
(c) m/s (d) mm/s
Answer : (b) s/m

6. Four cars A, B, C and D are moving on a levelled, straight road. Their distance-time graphs are shown in the given figure. Which of the following is the correct statement regarding the motion of these cars?



(a) Car A is faster than car D
(b) Car B is the slowest
(c) Car D is faster than the car C
(d) Car C is the slowest
Answer : (b) Car B is the slowest

7. The slope of a distance-time graph of a moving object indicates :
(a) distance moved by the object
(b) time taken by the object
(c) speed of the object
(d) position of the object
Answer : (c) Speed of the object

8. An athlete attains a maximum speed of 36 km/h. This speed is equal to :
(a) 5 m/s (b) 10 m/s
(c) 15 m/s (d) 20 m/s
Answer : (b) 10 m/s

9. A student draws a distance-time graph for a moving scooter and finds that a section of the graph is a horizontal line parallel to the time axis. Which of the following conclusion is correct about this section of the graph?
(a) The scooter has uniform speed in this section
(b) The distance travelled by scooter is the maximum in this section
(c) The distance travelled by the scooter is the minimum in this section
(d) The distance travelled by the scooter is zero in this section
Answer : (d) The distance travelled by the scooter is zero in this section

10. The distance-time graph of a car which comes to a stop after covering a certain distance will be :
(a) a straight line sloping upwards
(b) a curved line sloping downwards
(c) a straight line parallel to time axis
(d) a straight line parallel to distance axis
Answer : (c) a straight line parallel to time axis

11. The S.I. unit of mass is
(a) newton (b) kilogram
(c) newton/kg (d) gram
Answer : (b) Kilogram

12. The S.I. unit of weight is
(a) kilogram (b) newton
(c) newton metre (d) kilometre
Answer : (b) Newton

B. Fill in the blanks :

1. The movement of an object is called……
Answer : Motion.

2. When all the parts of an object move the same distance in a given time is called…….motion.
Answer : Translatory motion.

3. A bullet fired from a gun is an example of……motion.
Answer : Translatory motion.

4. Movement of the moon around the earth is the example of…….motion.
Answer : Periodic motion.

5. The spinning of earth on its axis is an example of……..motion.
Answer : Rotational motion.

6. The motion of a car running at a constant speed is an example of……motion.
Answer : Uniform motion.

7. Mass is a……quantity which has only magnitude but no direction.
Answer : Scalar.

8. The acceleration produced by the force of attraction of the earth is known as acceleration due to……..
Answer : Gravity.

9. The……of a body changes from place to place.
Answer : Weight.
10. A……measures the weight of a body by opposing the force of a gravity with the force of an extended spring.
Answer : Spring balance.

C. Write T for true and F for flase statements :

1. Every object moves with a constant speed.
Answer : False.

2. Speedometer indicates the speed in km/s.
Answer : False.

3. Odometer measures the distance covered in kilometres.
Answer : True.

4. The speed of a train is expressed in m/h.
Answer : False.

5. Distances between two cities are measured in kilometres.
Answer : True.

6. The basic unit of time is second.
Answer : True.

7. A straight-line graph parallel to the time-axis (or a horizontal line graph) tells us that the object has become stationary.
Answer : True.

8. The S.I. unit of mass is gram.
Answer : False.

9. The mass of a body can be zero.
Answer : False.

10. Weight is a scalar quantity.
Answer : False.

D. Match the following :

1. Turning of a potter's wheel
a. Scalar quantity
2. Motion of fish swimming underwater
b. Vector quantity
3. Weight
c. Non-uniform motion
4. Mass
d. Random motion
5. Motion of a train starting from a railway station **e.** Circular motion

Answer : 1. → (e) Circular motion
2. → (d) Random motion
3. → (b) Vector quantity
4. → (a) Scalar quantity

E. Give two examples :

1. Periodic motion
Answer : (i) Swinging of simple pendulum
(ii) Rotation of earth at its axis

2. Oscillatory motion
Answer : (i) The swinging pendulum of a clock
(ii) The swinging face of a table fan

3. Rotational motion
Answer : (i) Earth rotation
(ii) Tyre rotation of a vehicle

4. Scalar quantities
Answer : (i) Mass
(ii) Length

5. Vector quantities
Answer : (i) Velocity
(ii) Displacement

A. Answer the following questions in short.

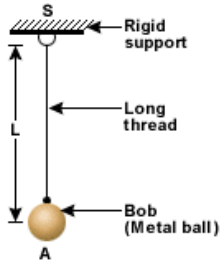
1. What is motion? Name the different types of motion.
Answer : An object is said to be in motion (or moving) when its position chnages with time.
There are different kinds of motion around us are :
(i) Translatory motion
(ii) Circular motion
(iii) Rotational motion
(iv) Repetitive motion
(v) Oscillatory motion
(vi) Random motion

2. What do you understand by periodic motion? Give one example.
Answer : Periodic motion repeats itself after a fixed interval of time.
For example : (i) Revolution of the Earth around the Sun takes place after one year.
(ii) Revolution of the Moon around the Earth occurs exactly after 27 days.

3. Name the motion of a moving butterfly. Give two more examples of this type of motion.
Answer : Random motion.
Examples : (i) Motion of kite flying in the air.
(ii) Motion of fish swimming unerwater.

4. Define oscillatory motion.
Answer : If an object moves in a to and fro motion about its mean position, it said to be in oscillatory motion.
For example : Motion of a swing, the swinging pendulum of a clock, etc.

5. What is a simple pendulum?
Answer : A simple pendulum consists of a small metal ball (called bob) suspended by a long thread from a rigid support, such that the bob is free to swing back and forth.



Simple pendulum

6. What is a scalar quantity?
Answer : Some physical quantities such as mass, length, time, density, speed, etc. require only magnitude for their representation. Such physical quantities are known as scalar quantities.

7. Explain non-uniform motion. Give one example.
Answer : Non-uniform motion is defined as, when an object travels unequal distances in equal interval of time.

For example : The motion of a train starting from a railway station is an example of non-uniform motion.

8. Define mass. What is its S.I. unit?
Answer : The mass of a body is the quantity of matter (or material) cntained in it. Mass is a scalar quantity which has only magnitude but no direction.
The S.I. unit of mass is kilogram [kg].

9. Name the instrument used to measure weight.
Answer : Spring balance.

10. Name the two types of motion exhibited by a ball rolling on the ground.
Answer : Rotational motion as well as rectilinear motion.

11. State the type of motion possessed by the branch of a tree moving to and fro. Give two more examples of this type of motion.
Answer : If an object moves in a to and fro motion about its mean position, it said to be in oscillatory motion.
For example : (i) Motion of a swing.
(ii) The swinging pendulum of a clock.
(iii) The swinging face of a table fan.

B. Answer the following questions in detail.

1. When is an object said to be in motion? Explain with the help of an example. State any four types of motion.
Answer : A body is said to be in motion (or moving) when its position changes continuously with respect to a fixed point in its surrounding. This fixed point may be a stationary object and is taken as the reference point.
For example : Cars and buses running on the road, are said to be in motion because they are changing their positions with respect to some fixed object on earth like houses and trees.
Four types of motion :
(i) Translatory motion
(ii) Circular motion
(iii) Rotational motion
(iv) Repetitive motion

2. What is meant by
(a) circular motion, and
(b) rotational motion?
Give two examples of circular motion and two examples of rotational motion.
Answer : Circular motion : When an object moves along a circular path, it is called circular motion.
For example : (i) Movement of the moon around the earth.
(ii) The Movement of the Earth around the Sun are the examples of circular motion.

Rotational motion : When an object turns (or spins) about a fixed axis, it is called rotational motion.
For example : (i) A spinning top (lattu) moves round and round on its axis.
(ii) Turning of a bicycle wheel are the examples of rotational motion.

3. Define the following for a simple pendulum:
(i) Amplitude
(ii) Frequency
(iii) Oscillation
Answer : (i) Amplitude : The maximum displacement of the bob when it swings (oscillates) to and fro, from its central poistion (mean position) on either side is called the amplitude of the pendulum.
(ii) Frequency : The number of complete oscillations made by a simple pendulum in one second is called its frequency.
(iii) Oscillation : One complete to-and-fro movement of the pendulum bob is called oscillation.

4. What is meant by 'uniform motion' and 'non-uniform motion'? Give one example of uniform motion and one of non-uniform motion.
Answer : Uniform motion : A body is said to have uniform motion, if it travels equal distances in equal intervals of time.
For example : A motorcycle running at a constant speed of 10 m/s, will cover equal distance of 10 m in every second.

Non-uniform motion : A body is said to have non-uniform motion, if it travels unequal distances in equal intervals of time.
For example : The motion of a train starting from the railway station is non-uniform, when the train starts from a station, it moves very slowly and covers a small distance in a small time interval. In the next, time interval it covers more distance, and so as time passes, the train goes on increasing its speed.

5. Define speed. What is its S.I. unit? Also write the units for small and large values of speed.
Answer : Speed : Speed of a body is the distance travelled by its per unit time.

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$

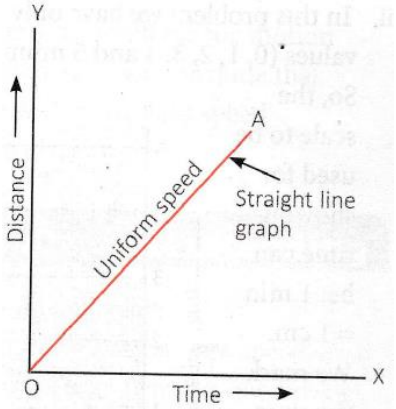
Unit of speed : The unit of speed depends upon the units of distance and time.

$$\text{Unit of speed} = \frac{\text{Unit of distance}}{\text{Unit of time}}$$

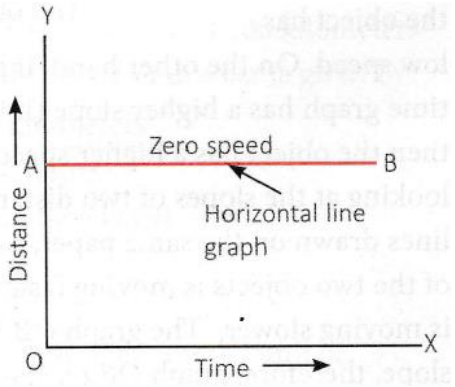
$$\text{Speed} = \frac{\text{metre}}{\text{second}}$$

The S.I. unit of speed is metre per second.
The small values of speed are :
centimetre per second (cm/s)
The large values of speed are :
Kilometre per hour (km/h)

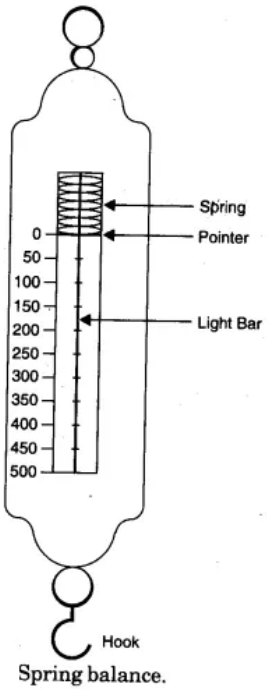
6. Draw the distance-time graph :
(a) for an object moving at constant speed.
(b) for a stationary object (which is not moving).
Answer : (a) Distance-time graph for uniform speed (or constant speed) :



(b) Distance-time graph when the object is stationary (not moving) :



7. Draw a neat, labelled diagram of a spring balance.
Answer :



Spring balance.

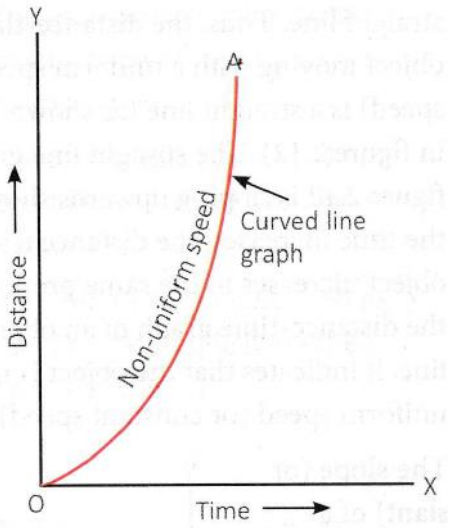
8. Differentiate between mass and weight?
Answer :

	Mass	Weight
1.	The mass of an object is the quantity of matter contained in it.	The weight of an object is the force with which it is attracted towards the centre of the earth.
2.	The S.I. unit of mass is kilogram (kg).	The S.I. unit of weight is newton (N).
3.	The mass of an object is constant.	The weight of an object is not constant. It changes with the change in acceleration due to

		gravity (g).
4.	The mass of an object can never be zero.	The weight of an object can be zero. For example, in the interplanetary space, where g = 0, the weight of an object becomes zero.

9. Mass of an object cannot vary from place to place but weight can. Why?
Answer : Mass of an object is actually the amount of matter it contains and it would remain the same unless there is change in the amount of matter whereas weight of an object is the force on it due to gravity.. Consider an object with mass 1kg whose weight would be 9.81 N approx. on earth. It would be less in Mars due to variation in gravity. Weight of an object varies from place to place due to variation in gravity at different places. There are factors due to which acceleration due to gravity may vary . Like altitude, latitudes and even the spinning of our planet may vary acceleration due to gravity at different places on earth. Sometimes even geological factors account to change in value of acceleration due to gravity.

10. (a) Draw a distance-time graph to show the motion of a car moving with a speed which is not constant (non-uniform speed).
(b) State any two advantages of drawing distance-time graphs for moving objects.
Answer : (a) Distance-time graph for non-uniform speed (or changing speed) :



(b) Advantages of drawing distance-time graphs for moving objects :
(i) Distance-time graphs gives information about the nature of the motion of an object like uniform or uniform motion.
(ii) Motion of an object can be represented by its distance-time graphs.and it is easier to mark too.