# Motion, Force and Speed

# (English Medium)

**Exercise 65:**

**Solution 1(a):**

| Stationary objects | Non-stationary objects |
|---|---|
| The slide | Top |
| Tree | Swing |
| Fence | See-saw |
| Merry go round | Cars |

**Exercise 66:**

**Solution 1(a):**

The following objects are in motion:

1. A train in motion.
2. A swaying slide.
3. The hands of a wall clock.
4. The blades of an electric fan
5. Wings of a flying bird.

**Solution 1(b):**

No, the motion of each object is not the same. There is a difference in motion of different objects. Some objects perform linear motion, while some perform random motion; some

perform circular motion, while some perform oscillatory motion. Thus, we can say that different objects perform different type of motion.

**Solution 1(c):**

The following are some examples of linear motion:

1. Motion of a bicycle moving on a straight road
2. Motion of a bullet fired from a gun
3. Motion of light rays
4. Motion of a fruit falling from a tree

**Solution 1(d):**

The following are some examples of circular motion:

1. Motion of a merry-go-round
2. Motion of a farmer's sling
3. Motion of the blades of a fan
4. Motion of the Earth revolving around the Sun
5. Motion of a spinning top

**Solution 1(e):**

The following are some examples of uniform circular uniform motion:

1. Motion of the hands of a clock
2. Motion of the Earth around the Sun
3. Motion of the Earth around its own axis

**Exercise 66:**

**Solution 1(a):**

The following are some examples of periodic motion:

1. Motion of the hands of a clock
2. Motion of the Earth around the Sun

(**Note:** Periodic motion can be circular motion and oscillatory motion)

**Solution 1(b):**

The following are some examples of curved motion:

1. Motion of smoke arising from an incense
2. Motion of a flying mosquito
3. Motion of snake moving

**Solution 1(c):**

A moving bicycle performs random motion. The wheels of the bicycle perform circular

motion.

**Solution 1(d):**

1. Linear motion
2. Circular motion
3. Circular motion
4. Oscillatory motion
5. Circular motion as well as periodic motion
6. Periodic motion
7. Oscillatory motion
8. Circular motion
9. Periodic motion as well as circular motion
10. Random motion

**Exercise 68:**

**Solution 1(a):**

The small car is behind the passenger bus initially. But, in the second picture the car is in front of the passenger bus. Thus, we can say that the speed of the car is highest amongst the three vehicles.

**Exercise 70:**

**Solution 1(a):**

The pair D had the maximum speed because the pair had taken the least time to cover the same distance. Thus, an object which takes lesser time to cover the same distance travels with more speed.

**Solution 1(b):**

The pair E had maximum speed because the pair travels the maximum distance in the same time. Thus, an object which travels a greater distance in same time will have more speed.

**Solution 1(c):**

The other possible units of speed are centimeter/second or kilometer/hour.

**Solution 1(d):**

Distance travelled by Vijay on bicycle = 300 m
Time taken = 60 s
We have to find the speed of the bicycle.

$$\text{Speed of the bicyde} = \frac{\text{Distance travelled}}{\text{Time taken to travel that distance}}$$
$$= \frac{300\ \text{m}}{60\ \text{s}}$$
$$= 5\ \text{m/s}$$

Thus, the speed of the bicycle is 5 $\text{m/s}$.

**Exercise 71:**

**Solution 1(a):**

Distance travelled by Shruti = 100 m

Time taken = 8 s

We have to find the speed of Shruti

$$\text{Shruti's speed of running} = \frac{\text{Distance travelled}}{\text{Time taken to travel that distance}}$$
$$= \frac{100\ \text{m}}{8\ \text{s}}$$
$$= 12.5\ \text{m/s}$$

Thus, Shruti's speed of running is 12.5 m/s.

**Solution 1(b):**

Force was applied to move the tables in the classroom.

**Solution 1(c):**

We apply force for many activities in our day to day life. Some of them are as follows:

1. To perform all our daily morning routine activities.
2. In running and doing exercise
3. To lift our school bag
4. While walking to school
5. To lift a bucket
6. To water the plants
7. To hit the ball with a bat or throw a ball while playing cricket
8. To move an object like a book kept on table
9. To open or close a drawer
10. To kick a soccer ball, etc.

**Exercise 72:**

**Solution 1:**

The ball starts moving and set in motion from the state of rest.

**Solution 2:**

The speed of the ball increases.

**Solution 3:**

The direction of the moving ball changes.

**Solution 4:**

The rolling ball stops moving.

**Solution 5:**

Yes. The shape of the balloon changes.

**Exercise 73:**

**Solution 1(a):**

In our day to day life, muscular force is used for performing the following activities:

1. To lift a school bag
2. To ride a bicycle
3. To move a table
4. To climb staircase
5. To board a bus or a train

**Exercise 74:**

**Solution 1(a):**

In our day to day life gravitational force is useful in the following activities:

1. Fruits falling down to the ground
2. Jumping in a swimming pool
3. Sliding down a slide
4. Standing erect on the floor

**Exercise 75:**

**Solution 1(a):**

A person slips, when he/she steps on a banana skin. A person can walk easily due to friction between the surface of the road and soles of the feet. If the surface becomes smooth, the frictional force decreases. As the banana skin is slippery, when one steps on it, the frictional force necessary to walk is not produced. So, a person slips if he/she steps on a banana skin.

**Solution 1(b):**

When brakes are applied to a moving vehicle, frictional force is produced between the brakes and the rim of the vehicle. This reduces the speed of the vehicle and its motion is retarded.

**Solution 1(c):**

When vehicles move, friction is produced between the tyres of the vehicles and the ground. Due to friction, wear and tear is caused in the tyres of the vehicles. Hence, we need to change the tyres of our vehicles after sometime.

**Solution 1(d):**

When we walk, frictional force is produced between the sole of our shoes and the ground. The soles of the shoes wear and tear due to friction. Hence the soles of the shoes wear out after prolonged use.

**Exercise 76:**

**Solution 1(a):**

The moving parts of machine which are in contact rub over each other. This produces friction between them. This causes wear and tear of the parts of the machine which are in contact with one another.

**Solution 1(b):**

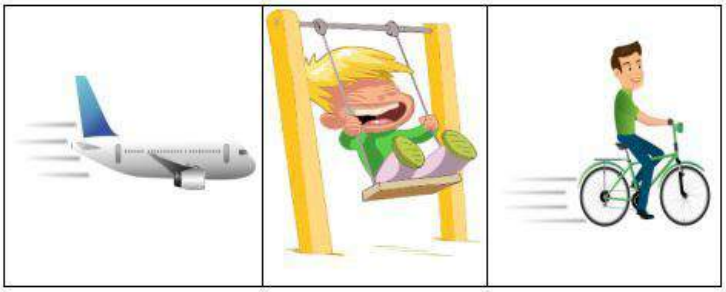
A rough surface has many ups and downs. So, when we ride a bicycle on such a rough surface the frictional force between the moving tyres of the bicycle and the surface increases. This reduces the motion of the bicycle. Thus to maintain the uniform motion of the moving bicycle on the rough surface more force is required.

**Solution 1(c):**

To stop the noise from different parts of bicycle, swing or machine we should oil the various parts of the machine and keep them clean.

**Solution 1:**

The following pictures are of moving objects:



**Solution 2.1:**

In picture (1), the force is applied in the same direction. Hence, the table will move and the displacement is more in this case. Whereas, in the picture (2) the force is applied in opposite directions. Hence, the table will hardly move and the displacement is less in this less.

**Solution 2.2:**

If frictional force is absent,

1. We will not able to walk on the ground and will keep slipping.
2. It will not be possible for us to hold a pencil, write on a paper, chew our food or even pick up a glass of water. Nothing will be steady on the ground.
3. We will not be able to apply brakes to stop the motion of a moving vehicle.
4. In case of machines, the motion of rotating wheels will not be transferred to another wheel by using a belt and the machines will not run.
   Thus, if frictional force is absent, we will have to face many difficulties in our daily life as well as work.

**Solution 2.3:**

If there is no gravitational force, then

1. Ripe fruits will not fall down to the ground and will instead remain floating in the space.
2. A ball thrown in the upward direction will not return back to the ground.
3. Rain will not fall down on the Earth.
4. If a glass filled with water is inverted, the water will not fall down to the ground and will remain hanging in space.
5. The weight experienced by our body will become negligible and we will float in air like paper.
6. Without gravitational force, the Earth and the other planets revolving around the Sun in their particular orbits will be thrown away in space and will no longer be attracted

towards the Sun.

7. Nothing in the surrounding will remain attached to the ground in the absence of gravitational force.
8. There will be no atmospheric layer around the Earth without gravitational force. So, it will not be possible for us to survive without gravitational force.

**Exercise 77:**

**Solution 3:**

**Vehicles used for transportation:**