Exercise Questions

1. Give two examples each of situations in which you push or pull to change the state of motion of objects.

Soln:

Examples of situations in which you push or pull to change the state of motion of objects are

1. Pull situations

a) In order to open a drawer, we have to pull it. This action changes the state of motion of the drawer.

b) To draw water from the well, the rope is pulled. This action changes the state of motion of the bucket.

2. Push Situations

a) A football is pushed by the foot of a player. This action changes the state of motion of the ball.

b) In order to change the place of the heavy box from one room to another, we have to push it. This action changes the motion of the box.

2. Give two examples of situations in which applied force causes a change in the shape of an object.

Soln:

The forces which change the shape of an object are as follows: i)

By pressing the clay between the hands, it deforms.

ii) The shape of the plastic bottle changes by squeezing it.

3. Fill in the blanks in the following statements.

(a) To draw water from a well, we have to _____ at the rope.

(b) A charged body _____ an uncharged body towards it.

(c) To move a loaded trolley, we have to _____ it.

(d) The north pole of a magnet _____the north pole of another magnet.

Soln:

1. To draw water from a well, we have to **pull** at the rope.
2. A charged body **attracts** an uncharged body towards it.
3. To move a loaded trolley, we have to **pull or push** it.
4. The north pole of a magnet **repels** the north pole of another magnet.

4. An archer stretches her bow while taking aim at the target. She then releases the arrow, which begins to move towards the target. Based on this information, fill up the gaps in the following statements using the following terms.

muscular, contact, non-contact, gravity, friction, shape, attraction

(a) To stretch the bow, the archer applies a force that causes a change in its _____.

(b) The force applied by the archer to stretch the bow is an example of _____ force.

(c) The type of force responsible for a change in the state of motion of the arrow is an example of a _____ force.

(d) While the arrow moves towards its target, the forces acting on it are due to _____ and that due to _____ of air Soln:

(a) To stretch the bow, the archer applies a force that causes a change in its **shape**.

(b) The force applied by the archer to stretch the bow is an example of **muscular** force.

(c) The type of force responsible for a change in the state of motion of the arrow is an example of a **contact** force.

(d) While the arrow moves towards its target, the forces acting on it are due to **gravity** and that due to **friction** of air.

5. In the following situations, identify the agent exerting the force and the object on which it acts. State the effect of the force in each case.

(a) Squeezing a piece of lemon between the fingers to extract its juice.

(b) Taking out paste from a toothpaste tube.

(c) A load suspended from a spring while its other end is on a hook fixed to a wall. (d) An athlete making a high jump to clear the bar at a certain height Soln:

a) We make a muscular force to extract the juice of the lemon by squeezing it. As a result, the shape of the lemon gets changed.

b) To take out paste from the toothpaste tube, we use our muscular force. This muscular force acting on the toothpaste tube leads to a change in its shape.

c) Here, the suspended load exerts a force on the spring and pushes the spring downwards. As a result, the spring gets stretched. Hence, its shape gets changed.

d) The feet of the athlete exert muscular force on the ground, which pushes the ground. This allows them to jump over the bar. As a result, their state of motion gets changed.

6. A blacksmith hammers a hot piece of iron while making a tool. How does the force due to hammering affect the piece of iron?

Soln:

A blacksmith uses their muscular force while hammering a hot piece of iron. The muscular force changes the shape of the iron so that it can be given the desired shape.

7. An inflated balloon was pressed against a wall after it had been rubbed with a piece of synthetic cloth. It was found that the balloon stuck to the wall. What force might be responsible for the attraction between the balloon and the wall?

Soln:

When an inflated balloon is rubbed with a piece of synthetic cloth, it becomes charged. A charged body attracts an uncharged body. When this charged balloon is pressed against a wall, it sticks to the wall. Thus, the electrostatic force acts between the charged balloon and the wall.

8. Name the forces acting on a plastic bucket containing water held above ground level in your hand. Discuss why the forces acting on the bucket do not bring a change in its state of motion.

Soln:

For holding the bucket of water above the ground, we use muscular force. This muscular force acts against the force of gravity that pulls the bucket towards the ground. The two forces are equal in magnitude but opposite in direction. Therefore, the net force on the bucket is zero. Hence, there is no change in the state of motion.

9. A rocket has been fired upwards to launch a satellite in its orbit. Name the two forces acting on the rocket immediately after leaving the launching pad.

Soln:

The force of gravity is the one which acts on the rocket to pull it towards the ground, and the other one is the force of friction due to the earth's atmosphere, which opposes its motion.

10. When we press the bulb of a dropper with its nozzle kept in water, the air in the dropper is seen to escape in the form of bubbles. Once we release the pressure on the bulb, water gets filled in the dropper. The rise of water in the dropper is due to (a) pressure of water

(b) gravity of the earth

(c) shape of rubber bulb (d) atmospheric pressure Soln:

a) Due to the atmospheric pressure, there is a rise of water in the dropper.

When all the air escapes from the nozzle, the atmospheric pressure, which is acting on the water, forces the water to fill up the nozzle of the dropper.