

## CHAPTER -8

### FORCE AND PRESSURE

#### EXERCISES

##### 1 Mark Questions

**Q1: Give two examples each of the situations in which you push or pull to change the state of motion of objects.**

**Answer:**

(i) Push: We close drawer by pushing.

We move a wooden box by pushing.

(ii) Pull: We draw water from a well by pulling the rope.

A horse pulls a cart.

**Q2: Give two examples of situations in which applied force causes a change in the shape of an object.**

**Answer:** When we apply force on a rubber band to stretch it and on clay to change its shape.

**Q3: Define force.**

**Answer:** Force is a push or pull on an object.

**Q4: What is meant by change in state of motion of the object?**

**Answer:** Any change in the speed or direction of motion or both means a change in state of motion of the object.

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**Q5: What is meant by muscular force?**

**Answer:** The force resulting due to the action of muscles is known as the muscular force.

**Q6: Which force is responsible for the weight of objects?**

**Answer:** The force of gravity is responsible for the weight of objects.

**Q7: Define atmosphere.**

**Answer:** The air surrounding us is known as atmosphere.

**Q8: An inflated balloon was pressed against a wall after it has been rubbed with a piece of synthetic cloth. It was found that the balloon sticks to the wall. What force might be responsible for the attraction between the balloon and the wall?**

**Answer:** Electrostatic force.

## **2 Mark Questions**

**Q1: A blacksmith hammers a hot piece of iron while making a tool. How does the force due to hammering affect the piece of iron?**

**Answer:** The force due to hammering causes the change in the shape of the iron and iron can be molded in the shape of the required tool.

**Q2: 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.**

**Answer:** The forces that act when a rocket leaves launching pad are as follows:

- (i) Gravitational force of the earth (downward)
- (ii) Frictional force of air (in opposite direction)

**Q3: When we press the bulb of a dropper with its nozzle kept in water, 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

**Answer:** (d) atmospheric pressure

**Q4: 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.**

**Answer:** Forces acting on bucket are as follows:

- (i) Muscular force of arms acting upward.
- (ii) Force of gravity acting downward.

Both the forces do not bring any change in the state of motion because both of them are acting in equal and opposite directions and thus they cancel each other's effect.

**Q5: Do we feel the effect of atmospheric pressure? Why?**

**Answer:** No, we do not feel the pressure of the atmosphere because air is present everywhere. Also the pressure of air inside our body is same as that of the atmosphere.

**Q6: Define Pressure. Write the relation between pressure force and area. Name the instrument used to measure atmospheric pressure**

**Answer:** Pressure is force per unit area.

$\text{Pressure} = \text{Force} / \text{Area}$

Barometer is use to measure atmospheric pressure.

**Q7: Give reasons for the following:**

- 1. The skiers use flat and broad skis**
- 2. Deep sea divers wear special suits.**

**Answer:** The skiers use flat and broad skis to ski on the snow. The larger surface of skis reduces pressure on snow and helps them to slide instead of sinking.

Deep sea divers wear special suits, because the pressure of water increases with depth. The increased pressure may hurt the body of divers.

**Q8: Name the two contact forces.**

- 1. Why do we observe sparks coming out from a synthetic shirt when we take it off our body?**
- 2. Which force pulls the iron nails towards a magnet?**

**Answer:**

1. Muscular force and force of friction.
2. The sparks come out from a synthetic shirt due to the electrostatic charge on it.
3. Magnetic force.

**Q9: How does the medicine enter a dropper?**

**Answer:** When the dropper is pressed, the air inside the dropper is driven out. The pressure inside the dropper decreases and the medicine rushes inside the dropper.

**Q10: You are given rubber sucker with a hook. Can you use it for hanging articles? Explain how? Give the principle involved.**

**Answer:** We can use it for hanging articles. On pressing the sucker, the air between the cup and the surface escapes out. The pressure inside is reduced, but the atmospheric pressure is more. Therefore, the sucker remains stuck.

## **5 Mark Questions**

**Q1: 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**

**Answer:**

- 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.

**Q2: 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. [NCERT]**

- (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**

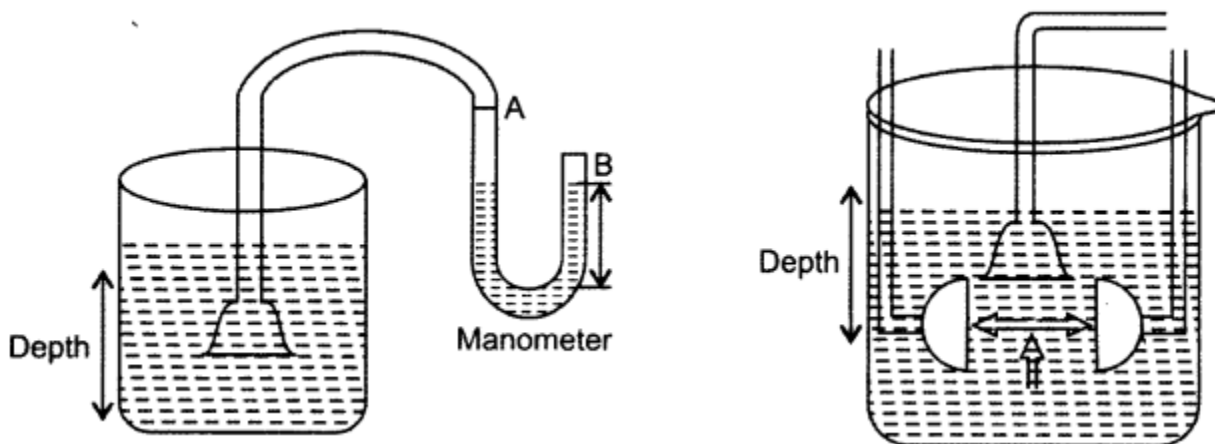
**Answer:**

Agent exerting the force	Object	Effect of force on object
(a) Fingers	Lemon	Lemon juice comes out.
(b) Fingers	Toothpaste tube	Toothpaste comes out.
(c) Spring	Load	Load is suspended.
(d) Athlete	Height of the Bar	Jumping helps to cross the bar

**Q3: Using a manometer how can you show that the liquid pressure remains same at the same depth?**

**Answer:**

Take a large glass jar full of water. Slowly lower the manometer into the water. Keep the funnel at the same depth, but pointing in different directions. You will notice that the difference in the liquid level remains the same. This proves that the pressure in a liquid remains the same in all directions at the same depth.



**Q4: 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**

**Answer:**

The forces acting on the bucket are its own weight acting downwards and the muscular force of the hand acting upwards. Since both the forces are equal and acting in opposite directions, they balance each other. So, they do not bring any change in the state of motion of bucket. The hand feels tired due to the weight of bucket.

**Q5:1. Define friction.**

**2. Is it a contact force or non-contact force?**

**3. Why do we rub our hands in winter?**

**Answer:**

1. Friction is the force which comes into play when one object moves on the surface of another.
2. It is a contact force.
3. When we rub our hands in winter heat is generated due to the force of friction. Therefore, we feel warm.



## Fill in the blank

1. To draw water from a well we have to \_\_\_\_\_ at the rope.

Answer: pull

2. A charged body \_\_\_\_\_ an uncharged body towards it.

Answer: attracts

3. To move a loaded trolley we have to \_\_\_\_\_ it.

Answer: push

4. The north pole of a magnet \_\_\_\_\_ the north pole of another magnet.

Answer: repels

5. To stretch the bow, the archer applies a force that causes a change in its \_\_\_\_\_

Answer: shape

6. The force applied by the archer to stretch the bow is an example of \_\_\_\_\_ force.

Answer: muscular

7. The type of force responsible for a change in the state of motion of the arrow is an example of a \_\_\_\_\_ force.

Answer: contact

8. While the arrow moves towards its target, the forces acting on it are due to \_\_\_\_\_ and that due to \_\_\_\_\_ of air.

Answer: gravity, friction

## **Multiple Choice Questions**

**1. A batsman hits a cricket ball which then rolls on the level ground. After covering a short**

**distance the ball comes to rest. The ball stops due to**

- (a) magnetic force
- (b) frictional force
- (c) gravitational force
- (d) muscular force

**Answer:** (b) frictional force

**2. When two forces applied on an object are equal and opposite, then these forces**

- (a) may move the object.
- (b) May stop the object.
- (c) May move the object and also cause a change in its shape.
- (d) Do not move the object but may cause a change in its shape.

**Answer:** (d) Do not move the object but may cause a change in its shape.

**3. When two unbalanced forces act on a body, in opposite directions, the net force is equal to**

- (a) the sum of the individual unbalanced forces.
- (b) zero.
- (c) difference between the two unbalanced forces and is in the direction of the larger force.
- (d) Difference between the two unbalanced forces and is in the direction of smaller force.

**Answer:** (c) difference between the two unbalanced forces and is in the direction of the larger force.

**4. Nails have pointed ends. This results in**

- (a) a decrease in the force exerted on them.
- (b) A decrease in the effect of the force exerted on them.

- (c) An increase in the force exerted on them.
- (d) An increase in the effect of the force exerted on them.

**Answer:** (c) An increase in the force exerted on them.

**5. Which of the following is an example of contact force?**

- (a) Magnetic force
- (b) Muscular force
- (c) Electric force
- (d) Gravitational force

**Answer:** (b) Muscular force

**6. Fruits falling from trees are an example of**

- (a) gravitational force
- (b) muscular force
- (c) frictional force
- (d) electric force

**Answer:** (a) gravitational force

**7. The unit of measuring pressure is**

- (a) Newton
- (b) Newton/meter
- (c) metre<sup>2</sup>
- (d) metre<sup>2</sup>/newton

**Answer:** (b) Newton/meter

**8. During dry weather, rubbing a plastic scale with dry hair attracts small pieces of paper. This is due to**

- (a) gravitational force
- (b) electrostatic force
- (c) frictional force
- (d) muscular force

**Answer:** (b) electrostatic force

## SUMMARY

- A push or pull that an object experiences as a result of its interaction with another item is referred to as a force.
- The total sum of all the forces acting on the object is what we refer to as the magnitude of forces. When exerting force on an object, interaction between the force source and the object is necessary.
- Pressure is defined as force per unit of area.
- Liquids and gases exert pressure on the walls of their containers. Air pressure develops as a result of frequent collisions between the air's small gas molecules and the container's walls.
- Atmospheric pressure is the term for the force that the air around us is exerting.