11 Force and Pressure

Topics Covered

11.1 Force: Causes and Effects
11.2 Types of Forces
11.3 Pressure and Its Applications

Important Points to Remember

- A push or pull on an object is called **force**.
- A force can change the state of motion.
- A force can move an object at rest.
- If the applied force is in direction of motion, the speed of object increases.
- If the applied force is in opposite direction of motion, the speed of object decreases. In this case, the object may also come to rest.
- If the applied force is at some acute or obtuse angle to the direction of motion, the direction of motion changes.
- Force can change the shape of an object.
- A force which can produce its effect only by making a contact with object is called **contact force**. Muscular force and friction are the contact forces.
- When one surface is moving over another surface, a force opposes their relative motion. This force is called **force of friction** or **friction**.
- A force which can produce its effect without making a contact with object is called non-contact force. Magnetic force, electrostatic force and gravitation are non-contact forces.
- A force applied by a magnet is called **magnetic force**. A magnet can exert its force on an object even without touching that object.
- The force applied by a charged body on another charged or non-charged body is called **electrostatic force**.
- Every object in the universe exerts a force on another object. This force is called gravitational force. Anything which is thrown up falls down on earth because of gravitational pull of the earth.
- The force acting on a unit area on an object is called **pressure**.
- Liquids and gases exert pressure.
- Pressure on the bottom of a container depends on the height of column of gas or liquid. Due to this, pressure at the bottom of sea is much larger than at shallower depths.
- The pressure exerted by atmospheric air is called **atmospheric pressure**. The weight of air in a column of height of atmosphere and area 10 × 10 cm is 1000 kg.

11.1 Force: Causes and Effects

Force: A push or a pull on an object is called force.

Unit of force: Its S.I. unit is Newton.

- **Resultant force:** The total force applied on an object is called resultant force. If there are two forces acting on an object in the same direction, the resultant force is the sum total of these two forces.
  - ☞ When two equal forces act on an object in opposite directions, the resultant force becomes zero and the object does not move. Such forces are called *balanced forces.*
  - ☞ When two unequal forces act in opposite direction, the resultant force is found to be the difference between the two forces. It moves the body in the direction of the larger force.

Causes

- **Forces are due to an interaction:** Without any interaction, force cannot be applied to change the state of an object.

Effects

Force can cause motion in a stationary body.

Example: We apply force to push a chair, move a bicycle. However it is not necessary that a force always makes a stationary body move. Example – you cannot move a wall by applying force.

Force can stop a moving body

Example: The goalkeeper in a football match tries to stop the ball by applying force. When we apply brakes, a moving bicycle stops.

Force can change the direction of motion of a moving body.

Example: A batsman hits the ball with his bat, the direction of the moving ball changes.

Force can change the speed of a moving body.

Example: When force is applied on the pedal of a cycle by a cyclist, its speed increases.

Force can change the shape and size of a body.

Example: When we crush a piece of paper, squeeze a tube of paint, we apply force to change the shape and size of the object.

Exercise 11.1

I. Very Short Answer Type Questions (1 Mark)

1. Give one word for the following:

(*a*) A push or a pull on an object. _____

(*b*) The property due to which force can be applied on an object. _____

(*c*) When two equal forces act in opposite direction the resultant force is _____

2. Fill in the blanks:

(*a*) _____ is a push or a pull on an object.

(*b*) Force needs _____ with an object to change its state.

(*c*) Force can stop a _____ body.

(*d*) Force can change the _____ of a body.

(*e*) A _____ can move an object from its state of rest.

(*f*) The S.I. unit of force is _____.

II. Short Answer Type Questions-1 (2 Marks)

3. State the effect of force in each case. (*NCERT*)

(*i*) Taking out shaving cream from a shaving cream tube.

(*ii*) A person holding a briefcase in his hand.

(*iii*) An athlete making a long jump.

(*iv*) Squeezing of a lemon to extract lemon juice.

4. When you switch off a fan, it soon comes to rest. Why?

5. A ball of dough in rolled into a flat chapatti. Name the force exerted. (*NCERT Exemplar*)

6. Define force. State its unit.

7. State two effects of force.

III. Short Answer Type Questions-2 (3 Marks)

8. When you pull at the sling of a rubber catapult, it stretches. What effect of force is demonstrated in this case?

9. In a game of tug of war, two teams exert forces of 30 N each. What is the net force acting on the rope.

10. A cricketer uses his bat to deflect a ball straight towards the boundary. What effect of force is illustrated in this case? Explain.

11. What kind of force does a coolie exert when he lifts the luggage?

12. Two persons are applying forces on two opposite sides of a moving cart. The cart still moves with the same speed in the same direction? What do you infer about the magnitude and direction of the forces applied. (*NCERT Exemplar*)

IV. Long Answer Type Questions (5 Marks)

13. An archer shoots an arrow in the air horizontally. However, after moving some distance, the arrow falls to the ground. Name the initial force that sets the arrow in motion. Explain why the arrow ultimately falls down.

14. Give two examples each when a force

(*a*) produces motion (*b*) stops motion

(*c*) only tends to produce motion (*d*) only tends to stop motion

(*e*) changes the direction of motion (*f*) changes the shape of a body

15. In a horse-cart, each of the two horses pull with a force of 1000 N. Find the resultant force. Give reason.

16. In a game of tug of war, three girls of team A pull the rope with the forces of 80 N, 100 N and 120 N. In team B, three girls pull the rope with forces of 85N, 105N and 125N. What is the resultant force of both teams? Which team is the winner?

ANSWERS

1. (*a*) Force (*b*) interaction (*c*) zero
2. (*a*) Force (*b*) interaction (*c*) moving (*d*) shape (*e*) force (*f*) Newton
3. (*a*) Force can change the shape.
   (*b*) Force can stop a moving body.
   (*c*) Force can change the direction of motion.
   (*d*) Force can change the shape of an object.
4. This is due to the effect of force. Force can stop a moving body and bring it to rest.
5. Force can change the shape and size of dough into a rolled chapatti.
6. A push or a pull on an object is called force. Its S.I. unit is Newton.
7. (*a*) Force can cause motion.
(*b*) Force can stop a moving body.
8. It changes the shape of the sling of the catapult.
9. Since each force is 30 N acting in the opposite direction, so the resultant force is zero.
10. It changes the direction of motion.
11. A coolie tends to produce motion when he lifts luggage on his head.
12. Both have applied forces of equal magnitude in opposite directions. Due to which the forces cancel out each other and resulting into zero force and hence the moving cart keeps on moving in the same direction.
13. While stretching the bow, the archer applies muscular force which changes the shape of the bow. On releasing the string, it regains its original shape that provides the initial force to set the arrow in motion. The force of gravity acting on the arrow in the downward direction brings it to the ground.
14. (*a*) Force can cause motion – (*i*) Pushing a chair, (*ii*) lifting a bucket from the floor.
(*b*) Force can stop motion – (*i*) The goalkeeper in a football match tries to stop the ball by applying force, (*ii*) Applying brake to stop the moving vehicle.
(*c*) Force only tends to produce motion – (*i*) pushing a tree in the garden, (*ii*) pushing a wall.
(*d*) Force only tends to stop motion – (*i*) A speeding bicycle tends to slow down by applying force, (*ii*) Pushing a heavy rolling stone on the mountain by weak plants and bushes.
(*e*) Force changes the direction of motion: (*i*) A batsman hits the ball with his bat, the direction of the moving ball changes, (*ii*) when a stretched spring releases, it moves in opposite direction that of applied force.
(*f*) Force changes the shape of a body – (*i*) When we crush a piece of paper, (*ii*) squeeze a tube of paint.
15. F1 = 1000 N F2 = 1000 N
Resultant force = F = F1 + F2
= 1000 + 1000
= 2000 N
The resultant force is applied in the same direction, so the resultant force is the sum of the forces acting on it.
16.

Team A	*Team B*
$F_1 = 80$ N	$F_1 = 85$ N
$F_2 = 100$ N	$F_2 = 105$ N
$F_3 = 120$ N	$F_3 = 125$ N
Resultant force	Resultant Force
$F = F_1 + F_2 + F_3$	$F = F_1 + F_2 + F_3$
80 + 100 + 120	= 85 + 105 + 125
300 B	= 315 N

Team B is the winner, since their applied force is larger.

11.2 Types of Forces

Force may be classified as (*i*) contact force, (*ii*) non-contact force.

Contact Forces: These forces act only when the objects are in physical contact with each other. They are further classified as

(*i*) *Muscular force:* The force resulting due to the action of muscles is known as muscular force.
Example: Animals like bullock used in bullock-carts carry heavy loads with the`help of muscular force.

(*ii*) *Mechanical force:* The force exerted by a machine to do some work is called mechanical force. A car moves when its wheels move, which is due to the force exerted by the car engine.

(*iii*) *Frictional force (or Friction):* The force acting along the two surfaces in contact which opposes the motion of one body over the other is called the force of friction. It always opposes the motion of the moving body. Example of a moving ball on a rough surface gradually comes to a stop due to frictional force.

Non-contact Forces: Forces which acts even when the objects are not in physical contact with each other and can still bring changes, as by contact forces are called non-contact forces. Some important non-contact forces are:

(*i*) *Magnetic force:* When a magnet is brought near iron chips, the iron chips move towards the magnet under the influence of magnetic force. This type of force is called magnetic force. Without coming in contact, the magnet has pulled the iron chips towards itself. So it is an example of non-contact force.

(*ii*) *Electrostatic force:* On rubbing two objects an electric charge is produced which is stationary. The force exerted by a charged body on another charged or uncharged body is known as electrostatic force. *Example:* When we rub a plastic comb over dry hair and bring it near small bits of paper, they are attracted towards the comb as they move and stick to the comb. This is due to electrostatic force.

(*iii*) *Gravitational force:* Every object in this universe attracts every other object with a certain force. The force with which two objects attract each other is called force of gravitation/gravitational force. *Example:* A force exists between a pen and a book, you and a tree etc. The magnitude gravitational force depends on the masses of the two interacting bodies. If the masses are small, gravitational force is also small.

Force of Gravity: The force of attraction between any object and Earth is called force of gravity. Example: When we throw a ball, it fall down towards the earth. This is due to the force exerted by the earth on any falling object.

Exercise 11.2

I. Very Short Answer Type Questions (1 Mark)

1. *Give one word for the following:*

(*a*) Force applied by the muscles of our body. _____

(*b*) Force created between charged and uncharged bodies. _____

(*c*) Force responsible for the movement of moon around the earth.

_____

(*d*) An apple falls down the earth from a tree is due to _____

(*e*) The force that arises without two objects coming in contact.

_____

(*f*) A force that can act from a distance. _____

2. *Fill in the blanks:*

(*a*) The force of gravity is an example of _____ force.

(*b*) The force exerted by a magnet is _____.

(*c*) Friction is an example of _____ force.

(*d*) The north pole of a magnet _____ the north pole of another magnet.

II. Short Answer Type Questions-1 (2 Marks)

3. The door of a refrigerator gets 'shut by itself', when it is in 'nearly closed' position. Which type of force comes into play here? (*NCERT Exemplar*)

4. Two charged objects may attract or repel each other. Which type of force exists between them? (*NCERT Exemplar*)

5. A man pulls hard on a rod stuck in the ground and succeeds in taking it out. How?

6. The moon keeps on moving around the earth. Name the force responsible for this.

III. Short Answer Type Questions-2 (3 Marks)

7. What happens when a plastic comb is rubbed several times in dry hair and brought near the heap of bits of paper?

8. What do you mean by 'friction'?

9. Which force can be used to gather iron pins scattered on the floor? Explain.

IV. Long Answer Type Questions (5 Marks)

10. An inflated balloon was pressed against a wall after it has been rubbed with a piece of synthetic cloth. The balloon sticks to the wall. What forces might be responsible for the attraction between the balloon and the wall. [*NCERT*]

11. 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. [*NCERT*]

12. An archer stretches her bow while taking aim at the target. Based on this information, fill up the gaps in the following statements using the following terms. [*NCERT*]

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

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

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

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

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

Answers

1. (*a*) Muscular force
(*b*) Electrostatic force
(*c*) Gravitational force
(*d*) Gravitational force/Force of gravity
(*e*) Non-contact force
(*f*) Non-contact force
2. (*a*) Non-contact force
(*b*) Magnetic force (*c*) Contact force
(*d*) repels
3. Magnetic force.
4. Electrostatic force between two charged objects.
5. It is due to muscular force which is a contact force.
6. Gravitational force between the moon and the earth.
7. Small bits of paper are attracted towards the plastic comb. This is due to electrostatic force developed between the comb and bits of paper.
8. The force which is always present when two surfaces in contact are in motion and it tends to oppose their motion.
9. When a magnet in brought near iron pins, the iron pins move towards the magnet under the influence of magnetic force. This type of force is called magnetic force. Without coming in contact, the magnet has pulled the iron chips towards itself. So it is an example of non-contact force.
10. Electrostatic force as the balloon has developed an electric charge.
11. Frictional force and gravitational force.
12. (*a*) shape, (*b*) muscular, (*c*) contact, (*d*) gravity, friction.

11.3 Pressure and Its Applications

It is defined as the force acting on a unit area of the object. If 'P' is the pressure, 'F' is the force and 'A' is the area of contact, then,

$$\text{Pressure (P)} = (\text{Force}/\text{Area})$$

S.I. unit is pascal (Pa) which is [Newton/(metre)^2] or N/m^2.

Applications of Pressure

- A heavy truck is fitted with six to eight wheels. These wheels increases the area of contact on which the weight acts and hence reduces their pressure.
- The cutting edge of knives, scissors, axes etc. are sharp due to which the area of contact decreases and pressure exerted by them increases.
- A school bag has wide straps made of thick cloth so that the weight of the bag may fall over a large area of the shoulder producing less pressure on the shoulders.

Pressure Exerted by Liquids: When we pour liquid into a vessel, the weight of liquid contained in the vessel exerts pressure on the walls and bottom. It depends on the height of its column. More is the height, more in the pressure.

- Liquid exerts equal pressure at the same depth.
- Pressure of a liquid increases with depth.

Applications of Liquid Pressure

- The walls of a dam is made thicker at the bottom because pressure (liquid) increases with depth. A thicker wall can withstand a greater pressure exerted by water at greater depth.
- Water tanks are placed on the terraces in the building. This is because as the tanks are placed at a greater height, the pressure of water will be large enough to force the water to reach the taps of the houses.

Atmospheric Pressure: The layer of air surrounding our earth is called atmosphere. It extends upto a height of about 300 km above the surface of earth. The pressure exerted by the air due to weight is known as atmosphere pressure. As we got to higher altitudes, the atmospheric pressure decreases. It is measured by an instrument called barometre.

Applications of Atmospheric Pressure

- *Drinking straw:* We use a drinking straw to drink fruit juice. When we suck air at the upper ends, the pressure of air inside the straw is reduced. But the pressure acting on the surface of fruit juice is equal to the atmospheric pressure. This atmospheric pressure pushes the fruit juice up into the straw to your mouth.
- *Syringe:* When we dip a syringe in a liquid and pull the piston up, the pressure inside the syringe gets reduced. The atmosphere pressure acting on the surface of liquid pushes the liquid up into the syringe.

Exercise 11.3

I. Very Short Answer Type Question (1 Mark)

1. *Give one word for the following:*

(*a*) Force acting on a unit area is _____

(*b*) Gases and liquids are also called _____

(*c*) SI unit of pressure. _____

(*d*) Pressure exerted by air. _____

2. *Fill in the blanks:*

(*a*) _____ is defined as force per unit area.

(*b*) In case of solids, pressure _____ with increase in force; _____ with decrease in area.

(*c*) In liquids, pressure _____ with increase in height (depth) and density.

(*d*) The pressure exerted by air on the bodies situated at the surface of earth is called _____.

(*e*) _____ exerts pressure in all directions.

(*f*) The pressure of a liquid at a given depth is _____ in all the directions.

II. Short Answer Type Questions-1 (2 Marks)

3. Why do deep sea divers or high altitude fliers wear special suits?

4. Why does the ink of a fountain pen leak at higher altitudes?

5. How does atmospheric pressure helps in drinking juice with straw?

6. How is pressure related to force?

7. Why does the nose of some people start bleeding at higher altitudes?

III. Short Answer Type Questions-2 (3 Marks)

8. Explain why a wide steel belt is provided over the wheels of army tanks.

9. A heavy truck is fitted with six to eight wheels. Why?

10. The foundations of high-rise building are kept wide. Why?

11. School bags are provided with wide straps to carry them. Why is it so?

IV. Long Answer Type Questions (5 Marks)

12. (*a*) What is atmospheric pressure?
(*b*) Why are our bodies not crushed by the large pressure exerted by the atmosphere?
(*c*) Give one application of atmospheric pressure from everyday life.

13. A solid body weight 250 N. When placed on a wooden plank, the area of contact is found to be 10 m^2. Find the pressure exerted by the solid body on the wooden plank.

14. With the help of an activity, show that liquid exerts pressure on the
(*a*) base of the container
(*b*) walls of the container

15. Show that liquid exert equal pressure at the same depth with the help of an activity.

16. With the help of an activity, show that pressure in liquid increases with depth.

ANSWERS

1. (*a*) Pressure (*b*) Fluids
(*c*) Pascal
(*d*) Atmospheric pressure
2. (*a*) Pressure
(*b*) increases, increases
(*c*) increases
(*d*) atmospheric pressure
(*e*) liquids (*f*) equal
3. Deep sea divers have to wear specially designed suits, otherwise the developed huge pressure of water will crush their bodies. This is to counter balance this huge pressure. High fliers wear special suits since pressure decreases with high altitude. The difference in pressure will burst the bodies.
4. Because the air inside, the ink tube of the pen is at a higher pressure than the air outside.
5. When we suck air at the upper end of straw, the pressure of air inside the straw is reduced. But the pressure acting on the surface of fruit juice is equal to the atmospheric pressure. This atmospheric pressure pushes the fruit juice up into the straw to the mouth.
6. Pressure = (Force/Area), i.e. pressure is directly proportional to force. So as force increases, pressure increases and vice versa.
7. Because the pressure of air within their bodies is more than the atmospheric pressure and so the tiny blood vessels will burst, thereby causing bleeding.
8. As the broad belt increases the area of cross-section and reduces the pressure on the ground.
9. This is to prevent the tyres from sinking into the ground and to prevent damage to the roads, six to eight wheels are provided which increases the area of cross-section and decreases the pressure.
10. So that they do not sink under the extremely high pressure of the buildings.
11. The broad straps increases the area of contact between the strap and the shoulder. This in turn reduces the pressure on the shoulder due to the weight of the bag.
12. (*a*) The layer of air surrounding our earth is called atmosphere. It extends upto a height of about 300 km above the surface of the earth. The pressure exerted by this air due to weight is known as atmospheric pressure. As we go to higher altitudes, the atmospheric pressure decreases. It is measured by an instrument called barometer.
(*b*) It is because our blood contains dissolved oxygen at a pressure which

is slightly more than the atmospheric pressure. Thus, it counter-balances the atmospheric pressure.

(*c*) • *Drinking straw:* We use a drinking straw to drink any fruit juice. When we suck air at the upper ends, the pressure of air inside the straw is reduced. But the pressure acting on the surface of fruit juice is equal to the atmospheric pressure. This atmospheric pressure pushes the fruit juice up into the straw and then to the mouth.

• *Syringe:* When we dip a syringe in a liquid and pull the piston up, the pressure inside the syringe gets reduced. The atmospheric pressure acting on the surface of the liquid pushes the liquid up into the syringe. (Any one)

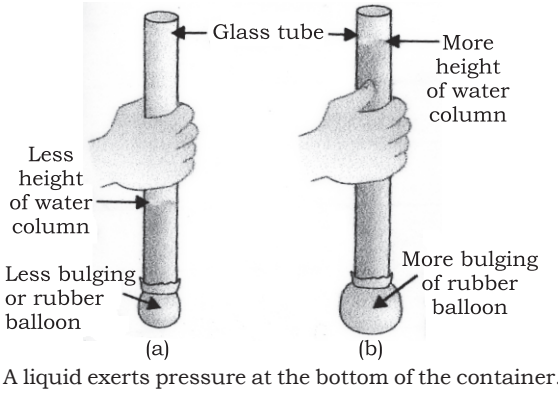
13. W = 250 N

A = 10 m

∴ Pressure = (F/A) = (250/10) = 25 Pa

14. (*a*) *Aim: To show that liquids exert pressure on the base of the container.*

Things needed: A hollow glass tube, rubber balloon and thread.



A liquid exerts pressure at the bottom of the container.

Method: Take a transparent glass tube opened at both ends. To one end of the tube, tie a rubber balloon. Now, hold the tube in vertical position and pour some water into it.

Observation: You observe that the rubber balloon bulges out. Now, pour more water in the tube. You see that the size of the bulge increases.

Conclusion:

(*i*) The liquids exert pressure on the base of the container in which they are put.

(*ii*) Pressure exerted by water at the bottom of the container depends on the height of its column. More is the height, more is the pressure and vice-versa.

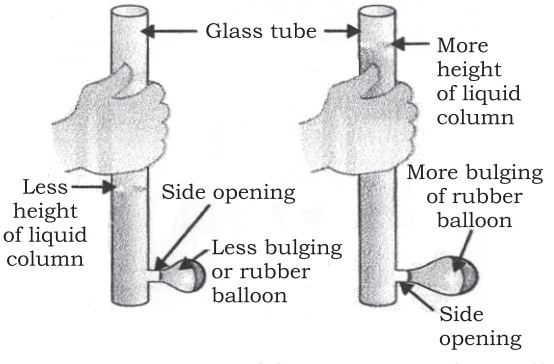
(*b*) *Aim: To show that liquids exert pressure on the walls of the container.*

Things needed: A glass tube with a side opening, rubber balloon and thread.

Method: Take a transparent glass tube (open at one end) with a tap-like opening on its side. Now, tie a rubber balloon to the opening. Hold the tube in middle, keeping it in a vertical position. Pour some water into the glass tube.

Observation: You observe that the rubber balloon bulges outwards (here sideways).

Pour more water into the glass tube. The rubber balloon bulges more.



Pressure exerted by water on the walls of the container depends on the height of its column.

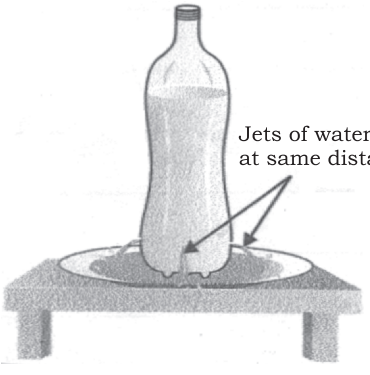
Conclusion:

(*i*) Liquids exert pressure on the walls of the container. Sideways pressure exerted by a liquid on the walls of the container is called its **lateral pressure**.

(*ii*) The rubber balloon bulges more on adding more water. The reason behind bulging of rubber balloon is that the depth of the water column

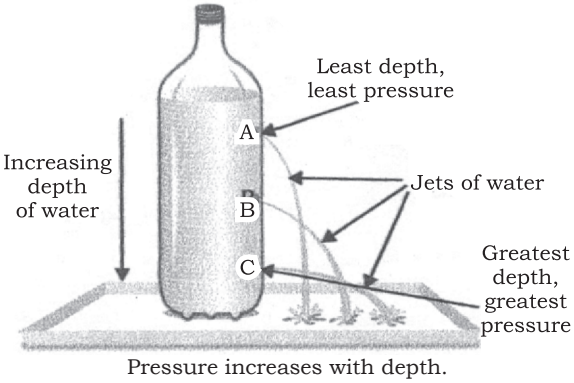
increases on adding more water and hence, the pressure increases. This shows that lateral pressure increases with depth.

15. *Aim: To show that liquids exert equal pressure at the same depth.*
Things needed: A plastic bottle and adhesive tape.
Method:
(*i*) Take an empty plastic bottle (1 litre). Make four holes, all around near the bottom of the bottle. Apply adhesive tape over the row of holes.
(*ii*) Fill the plastic bottle with water. Now remove the tape.
Observation: You observe that jets of water coming out of the holes fall at same distance from the bottle.



Conclusion: Liquids exert equal pressure at the same depth.

16. *Aim: To show that the pressure increases with depth.*
Things needed: A plastic bottle and an adhesive tape.
Method:
(*i*) Take an empty plastic bottle (1 litre). Make three holes of equal diameters at different heights. Apply adhesive tape over all holes.
(*ii*) Now, fill the bottle with water. Remove tape.
Observation: You observe that on removing the tape, the water from the uppermost hole A is found to travel the shortest distance from the base of the vessel. The water from the hole B goes a little farther away whereas the water from the lowermost hole C travels the maximum distance.



Pressure increases with depth.

Conclusion: The depth of water near hole A is less, so the water comes out from hole A with less pressure and falls near the base of the vessel. The depth of water near hole B is greater (than A), so the water comes out with the greater pressure from hole B and falls farther away from the base of the plastic bottle. The depth of water near hole C is the greatest. So, the water comes out with the greatest pressure and goes farthest from the container (plastic bottle). So, the pressure of a liquid increases with depth.

Did You Know?

- Atmosphere pressure is measured by an instrument called Barometer. We have mercury barometer and dry Barometer (without mercury) called Aneroid Barometer for measuring atmospheric pressure.

HOTS & VALUE BASED QUESTION

1. A man is pushing a cart down a slope. Suddenly the cart starts moving faster and he wants to slow it down. What should he do? What is the resultant force? **(HOTS)**

2. Which force is used by a doctor to remove a tiny iron filing from the eye of a patient? Explain. **(HOTS)**

3. Why is friction considered a necessary evil? **(HOTS)**

4. Two thermocol balls held close to each other move away from each other. When they are released, name the force which mightbe responsible for this phenomenon. Explain. **(HOTS)**

5. Camels walk easily in deserts as compared to horses. Why? **(HOTS)**

6. Why are the walls of a dam thicker near the bottom than at the top?

7. Nikita is cutting fruits for her grandmother as she is ill. She finds it difficult to cut fruits. She sharpens the cutting edge of the knife and cuts the fruits easily.

(*a*) How does sharpening of the knife help in cutting the fruits easily?

(*b*) What values are possessed by Nikita? **(VBQ)**

Answers

1. In order to stop the moving cart he should apply a force equal to the resultant force but in the opposite direction. The resultant force acting on it is the resultant of frictional force and gravitational force.
2. Magnetic force of magnet helps the doctor to remove very tiny iron filing from the eye of the patient keeping the magnet outside the eye.
3. Friction is considered as necessary evil because it is useful as well as harmful for us. It helps us to walk, write, lift objects. While sometimes it results in loss of energy, wear and tear of machinery parts.
4. Thermocol balls have same electrostatic charge thus, repel from each other on releasing. The force responsible for this motion is electrostatic force.
5. Camels have flattened broad soles as compared to horses. As the area increases, pressure decreases. So camels walk easily in deserts.
6. Pressure increases with depth in liquids, so the walls of a dam are thicker near the bottom which increases the area of cross-section and reduces the pressure.
7. (*a*) As the cutting edge is sharpened, the area of cross-section decreases and the pressure exerted by them increases which can easily cut a given surface (fruits).
   (*b*) Scientific bent of mind, logical reasoning.