Chapter 11 Force and Pressure

Question 1.
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.

Question 2.
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.

Question 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.
Answer:
(a) pull
(b) attracts
(c) push
(d) repels

Question 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.
Answer:
(a) shape
(b) muscular
(c) contact
(d) gravity, friction

Question 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.
Answer:
(a) Agents are fingers, object is lemon, effect of force changes the shape of lemon.

(b) Agents are fingers of the person squeezing the tube, object is toothpaste tube and effect of the force can be observed as the paste coming out of the tube (change in shape).
(c) Agent is the load suspended, object is the spring and effort can be seen in the form of elongation of spring on suspension of load (change in shape).
(d) Agent is muscles of athlete, object is athlete himself and effect of the force changes the state of motion of the athlete.

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

Question 7.
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.

Question 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.
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.

Question 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.
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)

Question 10.
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

Chapter 11 – 1 Mark Questions and Answers

Question 1.
When we press the bulb of a dropper with its nozzle kept in water, air in the dropper seems 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 [NCERT]

- pressure of water
- gravity of the earth.
- shape of rubber bulb.
- atmospheric pressure.

Answer:
atmospheric pressure

Question 2.
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 ? [NCERT]
Answer:
Electrostatic force.

Question 3.
Define force.
Answer:
Force is a push or pull on an object.

Question 4.
How many objects should be present for a force to come into play ?
Answer:
There should be atleast two objects for a force to come into play.

Question 5.
Two friends A and B are applying a force of 2 newton and 4 newton on a box in the same direction. What will be the total force applied by them ?
Answer:
The total force will be 6 newton, i.e., the sum of their individual forces.

Question 6.
In a tug of war, side A applies 10 newton force and side B applies 8 newton force. Which side will the rope move ?
Answer:
The rope will move towards side A as more force is applied by side A.

Question 7.
What happens to the speed of a body when a force is applied ?
Answer:
The speed of a body can be increased or decreased by applying force.

Question 8.
Can we change the direction of the moving object by applying a force ?
Answer:
Yes, we can change the direction of the moving object by applying a force.

Question 9.
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.

Question 10.
Is it possible that a force changes the direction of motion but not the speed of an object ?
Answer:
Yes, it is possible when a body is moving on a circular path.

Question 11.
Give an example to show that force can change the shape of an object.
Answer:
Pressing a rubber ball with the hand changes its shape

Question 12.
What is meant by muscular force ?
Answer:
The force resulting due to the action of muscles is known" as the muscular force.

Question 13.
What is meant by contact force ?
Answer:
A force which is applied only when it is in contact with an object is called a contact force.

Question 14.
Does the force of friction also act on the objects moving in the air ?
Answer:
Yes, air also offers friction to objects moving in air.

Question 15.
Is it essential for the agent applying a force on an object to be in contact ?
Answer:
No, the force can also act from a distance. It is known as non-contact force.

Question 16.
Give one example of a force which can act from a distance.
Answer:
Magnetic force, i.e., the force exerted by a magnet on another magnet or a piece of iron.

Question 17.
What is meant by force of gravitation ?
Answer:
The force of attraction exerted by the earth on all objects is called the force of gravitation.

Question 18.
Is the force of gravity a contact force or non-contact force ?
Answer:
Force of gravity is a non-contact force.

Question 19.
Which force is responsible for the weight of objects ?
Answer:
The force of gravity is responsible for the weight of objects.

Question 20.
Does the force of gravitation exist between two objects on the earth ?
Answer:
Yes, the force of gravitation exists between two objects on the earth but it is very weak.

Question 21.
Do the gases and liquids exert pressure on the walls of the container ?
Answer:
Yes, liquids and gases exert pressure on the walls of the container.

Question 22.
Define atmosphere.
Answer:
The air surrounding us is known as atmosphere.

Question 23.
Name two types of contact forces.
Answer:
Muscular force and frictional force.

Question 24.
Name the force due to which planets revolve around the sun.
Answer:
Gravitational force.

Chapter 11 – 2 Mark Questions and Answers

Question 1.
Why is it comfortable to lift a school bag with broad straps than thin straps ? [NCT 2008]
Answer:
Pressure is inversely proportional to area. Since broader straps have greater area, therefore, the pressure decreases.

Question 2.
Why do mountaineers suffer from nose bleeding at high altitudes ?
Answer:
The atmospheric pressure decreases with high altitude. Since the pressure of the blood inside the body is high, the nose starts bleeding.

Question 3.
Why is easier to hammer a sharp nail into wood than a blunt one ?
Answer:
Pressure = force / area.
Therefore, when we hammer a sharp nail, force acts on a smaller area, and it exerts more pressure on the nail.

Question 4.
How would pressure change if

1. area is doubled keeping force constant
2. force is doubled keeping area constant ?

Answer:

1. If area is doubled keeping the force constant, then pressure becomes half.
2. If force is doubled keeping area constant, then pressure becomes double.

Question 5.
Why are caterpillar tracks used in battle tanks instead of tyres ?
Answer:

Caterpillar tracks are used in battle tanks instead of tyres to increase the area of contact. As a result they can even cross sinking grounds as the pressure exerted on the ground is less.

Question 6.
Give two examples each of situations in which you push or pull to change the state of motion of objects. [NCERT]
Answer:
Push — moving a loaded cart, batsman hitting a ball.
Pull — opening a drawer, drawing a bucket of water from a well.

Question 7.
Give two examples of situations in which applied force causes a change in the shape of an object. [NCERT]
Answer:

- Pressing a lump of dough with hand.
- Pressing an inflated balloon.

Question 8.
A blacksmith hammers a hot piece of iron while making a tool. How does the force due to hammering affect the piece of iron ? [NCERT]
Answer:
The piece of iron becomes flattened due to the force of hammering.

Question 9.
A camel is able to move fast on sand. Why ?
Answer:
A camel is able to move fast on sand because it has flat broad feet. This increases the area of contact and therefore, the pressure exerted by the camel on the sand reduces. Hence, the camel's feet sink very little in the sand.

Question 10.
When does a force come into play ?
Answer:
An object's interaction with another object results in a force between the two objects.

Question 11.
If the force is applied opposite to the motion, what will happen to the speed of the object ?
Answer:
When the force is applied opposite to the motion of the object, then either the speed decreases or the direction changes.

Question 12.
State the two factors which describe the state of motion of an object.
Answer:
The state of motion is described by its speed and direction of motion.

Question 13.
A stone is tied to a thread and moved in a circular path. Is any force required to do this ? Is there any change in speed of the stone ?
Answer:
Yes, a force is required to keep the stone moving along a circular path with a constant speed, i.e., the speed does not change.

Question 14.
How do the mud particles fly off the wheels of a vehicle moving on the wet road ?
Answer:
The direction of the mud particles change at every point as the wheels of the vehicle move.

Question 15.
Can muscular force be applied on an object without being directly in contact with it ?
Answer:
No, muscular force can be applied only when it is in contact with an object.

Question 16.
Why does a boat come to rest when we stop rowing it ?
Answer:
The boat comes to rest when we stop rowing it due to the force of friction acting between the surface of water and the boat.

Question 17.
What is meant by electrostatic force ? Is it a contact force or a non-contact force ?
Answer:
The force exerted by a charged body is known as electrostatic force. It is a non-contact force.

Question 18.
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.

Chapter 11 – 3 Mark Questions and Answers

Question 1.
Define Pressure. Write the relation between pressure force and area. Name the instrument used to measure atmospheric pressure. [NCT 2009]
Answer:
Pressure is force per unit area.
Pressure = Force/Area
Barometer is use to measure atmospheric pressure.

Question 2.
Why is it difficult to cut vegetables with a blunt knife ?
Answer:
Pressure is inversely proportional to area. The area of the blunt knife is more and therefore, the effect of the force is less. Therefore, more force has to be applied.

Question 3.
Trucks intended to carry heavy loads have eight tyres instead of four tyres. Why ?
Answer:
Trucks intended to carry heavy loads have eight tyres, so as to increase the area of contact with the road. Since pressure is inversely proportional to area, less pressure is applied on the road.

Question 4.
Give reasons for the following :

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

Answer:

1. 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.
2. Deep sea divers wear special suits, because the pressure of water increases with depth. The increased pressure may hurt the body of divers.

Question 5.
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.

Question 6.
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.

Question 7.
A boy throws a ball upwards, but it comes down after sometime. Why ? Which force is acting on the ball ? What type of force is it ?
Answer: The ball comes down to the force of gravity exerted by the earth. Force of gravity is a non-contact force and it acts on a body even though the two are not in contact with each other.

Question 8.

1. Name the two contact forces.
2. Why do we observe sparks coming out from a synthetic shirt when we take it off our body ?
3. 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.

Chapter 11 MCQs

1. Question 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)
2. Question 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)

3. Question 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)
4. Question 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)
5. Question 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)
6. Question 6.
Fruits falling from trees is an example of
(a) gravitational force
(b) muscular force
(c) frictional force
(d) electric force
Answer: (a)
7. Question 7.
The unit of measuring pressure is
(a) newton
(b) newton/metre
(c) metre2
(d) metre2/newton
Answer: (b)
8. Question 8.
In liquids, the pressure
(a) increases with depth
(b) decreases with depth
(c) remains same at all depths
(d) sometimes increases sometimes decreases
Answer: (a)
9. Question 9.
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)