Science Chapter 09

Short Answer Type Questions

1. Identify the actions involved in the following situations as push or pull, or both:
   (a) Opening a drawer.
   Pull
   (b) A cricket ball hit by a batsman.
   Push
   (c) Drawing a bucket of water from a well.
   Pull
   (d) Moving a book placed on a table.
   Both
   (e) A football player taking a penalty corner.
   Push
   (f) Moving a wheel barrow.
   Both
2. (a) What is a force? State the various effects of force.
   A push or pull on an object is called force.
   The various effects of force are:
   (i) A force can move a stationary object.
   (ii) A force can stop a moving object.
   (iii) A force can change the speed of a moving object.
   (iv) A force can change the direction of a moving object.
   (v) A force can change the shape of an object.

   (b) Which of the following are non-contact forces?
   Magnetic force, Frictional force, Gravitational force, Muscular force, Electrostatic force.
   Magnetic force, Gravitational force, Electrostatic force.
3. What is a rubber sucker? How does it work? State any one use of a rubber sucker.
   Rubber sucker is a device which is used in place of glue for a temporary period which is used as sticking device. The principle behind the working of a rubber sucker is that when it is pressed against the wall or any surface it squeezes the air such that the atmospheric pressure outside the sucker holds it firmly against the surface.
4. Describe one activity to show the existence of atmospheric pressure.
   The crushing of a plastic bottle when filled with hot water is an example of existence of atmospheric pressure. This is because when the hot water is in the bottle then the air becomes lighter and hence the atmosphere puts a large pressure on it making it crushed.
5. What is meant by gravitational force (or force of gravity)? Give its one example.
   The pull exerted by objects possessing mass is called gravitational force. It is the gravitational force between the Sun and the Earth which holds the Earth in its orbit around the Sun.
6. Calculate the pressure when a force of 200N is exerted on an area of: (a) $10m^2$ (b) $5m^2$. What force acting on an area of $0.5m^2$ will produce a pressure of 500 Pa?

Given,
Force applied = 200 N

a) Area = $10m^2$
Pressure = 200/10
= 20 Pa

b) Area = $5m^2$
Pressure = 200/5
= 40 Pa

Area = $0.5m^2$
Pressure = 500 Pa
Force = 500 Pa × $0.5m^2$
= 250 N

7. (a) Which force do the animals apply while moving, chewing and doing other activities?
The animals apply a contact force called muscular force while moving, chewing and doing other activities.

(b) Which force is responsible for raising our body hair when we try to take off terylene or polyester shirt in dry weather?
It is the electrostatic force which is responsible for raising our body hair when we try to take off a terylene or polyester shirt in dry weather.

8. Why does a sharp knife cut objects more effectively than a blunt knife?
Sharp knife has less area in contact and more pressure making it easy to cut objects more effectively than the blunt knife which has more area in contact with the object.

9. Explain why, porters place a thick, round piece of cloth on their heads when they have to carry heavy loads.
The porters use thick round piece of cloth to increase the area on which the force is acting. As the area increases, pressure decreases because pressure is inversely proportional to the area.

10. Give one practical application of magnetic force.
One practical application of magnetic force is the closing of refrigerator door tightly.

Long Answer Type Questions

1. (a) What is meant by a contact force? Explain with the help of an example.

A force which can be exerted by an object on another object only through 'physical touching' is called a contact force.

Example – Muscular force: It can be applied to an object only when our body is in contact with the object such as pulling a table.

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(b) What is meant by non-contact force? Explain with the help of an example.

A force which can be exerted by an object on another object even from a distance is called a non-contact force.

Example – Magnetic force: A magnet can exert its magnetic force on iron objects from a distance such as electromagnets which are used to separate iron scraps.

2. (a) Define frictional force (or friction).

The force which always opposes the motion of one body over another body is called frictional force (or friction).

(b) Explain why, frictional force is said to be a contact force.

Since frictional force arises only when the surfaces of two objects are in touch with each other, therefore, frictional force is said to be a contact force.

(c) Explain why, magnetic force is said to be a non-contact force.

Since a magnet can exert its magnetic force on iron objects from a distance, therefore, magnetic force is said to be a non-contact force.

3. (a) Define pressure. What is the relation between pressure, force, and area. State the units in which pressure is measured.
   Pressure is defined as force acting per unit area. Different units of pressure are Pascal, Newton per square, atmosphere, torr, bar, and meters sea water.
   The relation between pressure, force, and area is:
   Pressure = Force/Area.

   (b) Explain why school bags are provided with wide straps to carry them?
   School bags are provided with wide straps to carry them because the force gets distributed throughout thereby reducing the pressure.

4. (a) What is meant by atmospheric pressure? What is the cause of atmospheric pressure?
   Atmospheric pressure is defined as the pressure exerted by the air that surrounds us. It is caused due to height of altitude and due to density of air.

   (b) Why are our bodies not crushed by the large pressure exerted by the atmosphere?
   Our bodies don't get crushed by the large pressure exerted by the atmosphere because our body is pressurized by the atmosphere. When we go deep inside the water say 100 meters, the capacity of lungs goes by half of the actual value thereby maintaining the pressure. When we go further 100 metres, then there are chances of ribs breakage.

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(c) Explain why atmospheric pressure decreases as we go higher up above the earth's surface.
The pressure decreases as we go higher up above the earth's surface because the gravitational force acting on the air molecules at higher altitude is less. When the air mass is not strong enough to get pull down by the gravity, the atmospheric pressure decreases.

5. (a) How does the pressure of a liquid depend on its depth? Draw a labelled diagram to show that the pressure of a liquid depends on its depth.
The pressure of a liquid is dependent on the depth because as the depth increases, the pressure exerted by the liquid also increases. This is because the weight of the liquid column pushing the liquid down increases which results in increased pressure.

(b) Explain why the walls of a dam are thicker near the bottom than at the top.
The walls of the dam are thick at the bottom than at the top because as the depth increases, the pressure exerted by the water increases. To withstand this pressure the bottom of the dams has thicker walls.

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