INDIAN SCHOOL AL WADI AL KABIR

CLASS: VIII	**DEPARTMENT: SCIENCE -2024-25**	**Date: 23-05-2024**
WORKSHEET NO.: 3 **WITH ANSWERS**	**TOPIC: FORCE AND PRESSURE**	**Note: A4 FILE FORMAT**
NAME OF THE STUDENT:	**CLASS & SEC:**	**ROLL NO.**

I. OBJECTIVE-TYPE QUESTIONS (1M)

1. A plastic scale rubbed with a piece of cloth attracts pieces of paper because of:
   a) Electrostatic force
   b) Friction
   c) Electricity
   d) Magnetism

2. Like poles of a magnet:
   a) Attracts each other
   b) Neither attract nor repel
   c) Repels each other
   d) None of these

3. As we travel in a flight, our ears pop because
   a) Air pressure around our ears increases
   b) The pressure exerted by the blood near the ears increases
   c) Air pressure around our ears decreases
   d) None of these

4. Boojho pushes a cart with force. After some time Paheli starts pushing the cart in the opposite direction with the same force. How does it affect the cart?
   a) It brings the cart to rest
   b) It changes the direction of the cart
   c) It increases the speed of the cart
   d) It will change the shape of the cart

5. When we place a magnet over a mixture of sand and iron, it attracts iron particles but not sand particles?

a) Iron is lighter than sand
b) Iron is a magnetic material, sand is not a magnetic material
c) Sand is insoluble in water
d) Iron is not a magnetic material, sand is a magnetic material

6. A force of 1400 N acts on the surface of an area of 200m^2 normally. What would be the pressure on the surface?
   a) 70 Pascal
   b) 7 Pascal
   c) 0.7 Pascal
   d) 700 Pascal

For the questions that follows, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below

i)Both A and R are true and R is the correct explanation of the assertion.
ii)Both A and R are true but R is not the correct explanation of the assertion.
iii) A is true but R is false.
iv) A is false but R is true

7. **Assertion (A):** A ball rolling along the ground, gradually slows down and finally comes to rest.
   Reason (R): This happens due to the force of friction between the ball and the ground.
   i) Both A and R are true and R is the correct explanation of the assertion.

8. **Assertion (A):** The relationship between pressure, force and area is given by F=P/A.
   Reason (R): The SI unit of force is N or Newton.

   iv) A is false, R is true.

9. **Assertion (A):** Atmospheric pressure is the force of gravity on air in a column of unit area.

   Reason(R): The pressure inside our body balances the atmospheric pressure from outside.

   ii) Both A and R are true but R is not the correct explanation of the assertion.

10. **Assertion(A):** In a tug of war, when both the teams pull the rope with equal and opposite forces, the rope remains stationery.
    Reason(R): The equal and opposite forces may bring about change in the state of rest.
    iii) A is true R is false

II. SHORT ANSWER QUESTIONS (2 M):

1. Define pressure. What is the SI unit of pressure [The force acting on a unit area of a surface is called **pressure**. Pressure = force/area] [S I unit N/m^2 or Pascal (Pa))

2. Identify the type of force in the below situations.

i. The water falls down when poured from a cup. [The force of gravity]
ii. We are able to walk properly on a levelled ground but it is difficult to walk on a slippery floor. [Frictional force]
iii. Person carrying a heavy load. [Muscular force]

3. Give two examples of situations in which force can bring about a change in the shape of an object. [(i) When we press dough for making chapati,
(ii) When we shape clay in pottery.]

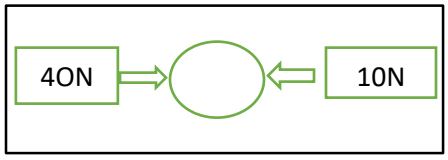
4. What is the similarity between electrostatic and magnetic forces?
[Both are non-contact forces, and both are attractive as well as repulsive forces.]

5. What happens when the forces are applied to an object in the opposite direction? [When the forces are applied to an object in the opposite direction, the net force is the difference between two forces.]

6. What is the direction of the earth's gravitational force? Do objects exert a gravitational force on all other objects? [Earth pulls everything towards its centre. Yes, All object in the universe exerts a gravitational force on all other objects]

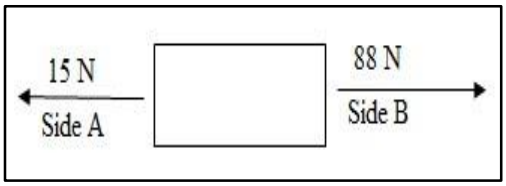
7. Give two examples of gases exerting pressure. [When we fill the syringe with medicine or some other liquid. When air is filled into a bicycle tube with a pump and the tube bulges.]

8. Two forces 40N and 10N act on a body in the opposite direction. What is the resultant force?[When two or more forces act in the opposite direction, the net force or the resultant force is the subtraction of the two forces i.e., 40 N - 10 N = 30 N]



9. What will be the net force on an object if two forces acting in the same direction are equal? Why? (If two forces acting in the same direction are equal, then the net force gets doubled as they add up.)
10. a) Why do you think that a balloon attached to the end of glass tube bulge more and more when water is added to the glass tube from the other side? [It is because of the property of the liquid pressure. Pressure at the bottom of the container depends on the height of the water column.]
b) Why do the pointed end of a high-heeled shoe exert greater pressure than the flat end? [The force is acting over a small area at the pointed end than the flat end. So as the area decreases pressure increases.]

11. In a tug of war, Side A applies 15N force and Side B applies 88N force. Which side will the rope move? What will be the net force acting on the rope? [If two forces are acting in opposite directions, then the net force will be the difference between the two forces. Therefore, the net force is 88-15=73N. The rope will move towards B.]



12. Distinguish between the magnetic force and the electrostatic force. [Magnetic Force is a force of attraction or repulsion between magnets and magnetic objects. Electrostatic Force pulls objects with different electrical charges together and pushes objects with similar electrical charges apart.]

III. SHORT ANSWER TYPE QUESTIONS (3 M)

1. In a tug of war, three boys of team A pull the rope with forces of 130 N, 320 N and 280N. In team B, the three members pull the rope with forces of 330 N, 150 N and 55 N. Who will win the tug of war? What is the resultant force? Force applied by team A = F_A = 130+ 320 + 280= 730 N
   Force applied by team B = F_B = 330 + 150 + 55= 535 N
   As $F_A > F_B$, the resultant force is in the direction of F_A. So, team A will win the tug of war. Resultant force = $F_A - F_B$
   = 730 – 535
   = 195N
2. Write one point of difference between contact and non-contact forces with an example. [Contact force- The force between two objects that are in physical contact. E.g. Striking a matchstick. Non-contact force-The force is applied to a body by another body that is not in direct contact with it. E.g. A magnet attracts or repels another magnet.]

3. How would you distinguish between balanced and unbalanced force.

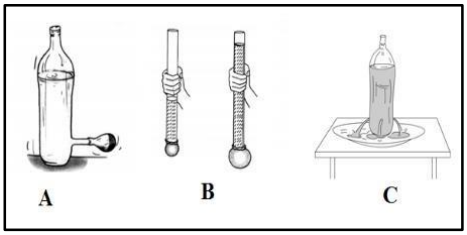
BALANCED FORCE	UNBALANCED FORCE
Equal forces acting on one object in opposite directions are called balanced forces.	Unequal forces acting on one object in opposite directions are called unbalanced forces.
The state of motion of the object remains unchanged.	There is a change in the state of motion of the object.
Net force is zero	Net force is not zero

4. a) Describe the change in direction of an object by applying force. [We can change the direction of an object by applying force at an angle. For example a batsman changes the direction of the ball by hitting it with the bat.]
   b) What are the effects of the application of force on an object? (A force may make an object move from rest, may change the speed of an object, if it is moving, may change the direction of motion of an object may bring about a change in the shape of an object may cause some or all of these effects.)

5. a) Why is it difficult to pull a rubber sucker, which is stuck to the wall? [It is difficult, because of differences in internal and external air pressure. There is less air pressure inside than outside, so outside air pressure pushes the surface of the rubber sucker towards the wall, making it difficult to pull.]

   Two students were on a road trip to a hill station and suddenly found that one was bleeding. What would be the reason for the same? [The atmospheric pressure is at a maximum on the surface of the earth. When we go to a higher altitude (say a high mountain), then the atmospheric pressure decreases. So, at high altitudes, the atmospheric pressure becomes much less than the pressure exerted by the fluids inside our body. Since our internal pressure by fluids is greater than the external air pressure some of the thin blood vessels in our nose burst and bleeding can occur.]

6. The picture shows the different properties of liquid pressure. State the properties of liquid pressure.
   [A-Liquid exerts pressure on the walls of the container.
   B- Pressure exerted by the water at the bottom of the container depends upon the height of the water column.
   C- Liquid exerts equal pressure at the same depth.]



IV. LONG ANSWER TYPE QUESTIONS (5 M):

1. Define the different forces with examples. State if the force is contact force or noncontact force.

[Muscular force is the force that is caused by the action of muscles inside the body. It is a contact force. E.g. Athletes use muscular force for running.

The frictional force is the force that opposes the motion of one body over the surface of another body. It is a contact force. E.g. A bicycle eventually comes to rest when you stop pedalling it. It is a contact force

Magnetic force is the force exerted by magnets on magnetic materials like iron. It can be either attractive or repulsive in nature. E.g. A magnet attracts magnetic materials. It is a noncontact force.

The Electrostatic force is a noncontact force. It is the force of attraction or repulsion exerted between charged particles or between a charged and an uncharged particle. E.g. A straw rubbed with paper attracts another straw but repels it if it has also been rubbed with a sheet of paper.

Gravitational force is the force of attraction acting between any two bodies of the universe.

The force of gravity is the earth's gravitational pull on a body. It is always attractive in nature. Falling of an apple from a tree or falling of any object when we throw anything up. It is a noncontact force]

2. Give a reason for the following.

   a) Vehicles like buses and trucks have broad wheels and they are more in number. [As huge vehicles have huge mass they will have huge force. In order to decrease the pressure the area is increased by increasing the number of wheels and making the wheels broad]
   b) It is easier to sew with a pointed needle than a blunt needle. [It is easier to sew with a pointed needle because the pointed end reduces the area of contact thereby increasing pressure and enabling us to stitch easily.]
   c) Foundations of high-rise buildings are kept wide. [It is because wide foundations increase the area of contact. The increased area reduces the pressure.]
   d) Balloons can be popped more easily with a pointed nail than by using fingers. [Pointed nails have less area compared to the fingers so they there more pressure is there when using pointed nails]
   e) It is easy to peel vegetables with a sharp knife. [It is easy to peel vegetables with a sharp knife instead of using a blunt knife because less area of contact and more is pressure exerted.]

3. a) Calculate the pressure produced by a force of 500 N acting on an area of 4 m^2. [P= F/A, 500/4= 125N/m^2]
   b) Over what area should a force of 250 N act to produce a pressure of 500 Pascal? [A=F/P=250/500=1/2=0.5m^2]
   c) The pressure of a gas contained in a cylinder with a movable piston is 120 Pa. The area of the piston is 10 m^2. Calculate the force exerted on the piston. [F=P x A = 120 x 10 = 1200N]
   d) If a force of 10N is applied over an area of 2.5 m^2. Calculate the pressure produced. [Pressure = F/A, 10/2.5 = 4 Pa]

V. a) <u>SOURCE-BASED</u> /<u>CASE STUDY-BASED QUESTIONS</u>

When a liquid is poured into a container, it presses on the sides and at the bottom of the container. The force exerted on a unit area is called pressure. Thus, pressure exerted by liquids is called liquid pressure. We can carry out different experiments to prove the properties of liquid pressure. To demonstrate that liquid exerts pressure we need to have a glass tube open at both the ends, balloons, and water. Fix balloon on one end of the glass tube and pour water from the other side. You can observe that as you continue to pour water, the balloons increase in size which proves that liquids exert pressure and it increases with the height of the water column

<u>Applications of liquid pressure:</u>

The base of the dam is made thicker because liquid pressure increases with depth. So to withstand the high pressure at the bottom, the walls are to be made thick at the bottom.

Fish have streamlined bodies in order to withstand the liquid pressure inside the water bodies.

Deep sea divers need to wear specially designed suits to help them withstand the immense liquid pressure

a) What is liquid pressure? [The pressure exerted by the liquid is known as liquid pressure.]
b) Fishes have streamlined bodies. Why? [Fishes have streamlined bodies in order to withstand the liquid pressure inside the water bodies.]
c) What happens when more and more water is poured through the glass tube with a balloon on one end? [The balloon increases in size as the liquid pressure increases.]

d)The base of the dam is made thicker. Give reason. [The base of the dam is made thicker because liquid pressure increases with depth. To withstand the high pressure at the bottom, the walls at the bottom are made thicker.]

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