INDIAN SCHOOL AL WADI AL KABIR

Class: VIII	Department: SCIENCE 2021 - 22	Date: 18.05.2021
Worksheet No.: 3 **WITH ANSWERS**	Topic: FORCE AND PRESSURE	Note: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

I. VERY SHORT ANSWER (1M)

1. What is force? [A push or pull that tends to affect an object in some way like change in speed, shape or direction of motion is called force.]
2. What is the SI unit of pressure? [N/m^2 or Pascal (Pa)]
3. Define pressure. [The force acting on a unit area of a surface is called **pressure**. Pressure = force / area]
4. What is atmospheric pressure? [The pressure exerted by air around us is known as atmospheric pressure.]
5. Identify the type of force in the below situations.
   i) A coin or a pen falls to the ground when it slips out of your hand. (Force of gravity)
   ii) A boat comes to rest if we stop rowing it. (Frictional force)
   iii) When a person lifts a bucket of water. (Muscular force)
6. Give two examples of situations in which force can bring about a change in the state of body. (When we push a bicycle to move it, when we pull the table it leads to change in position of table.)
7. How does an applied force changes the speed of an object?
   (If the applied force is in the direction of motion, the speed of the object increases. But if the force is applied in the direction opposite to the motion, then it decreases the speed of the object.)
8. What is the similarity between electrostatic and magnetic forces?
   (Both are non-contact forces, both are attractive as well as repulsive forces.)
9. What happens when the forces are applied on an object in the same direction? (Forces applied on an object in the same direction add to one another.)
10. What is the relation between direction of force of friction and direction of motion?
    (Direction of force of friction is always opposite to the direction of motion.)

For question numbers 11 to 13, 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.

11. **Assertion (A):** Water begins to flow towards the ground as soon as we open a tap.
    Reason (R): It is because of force of gravity, which makes things/objects fall towards the earth as it pulls them.
    i) Both A and R are true and R is the correct explanation of the assertion.

12. **Assertion (A):** The relationship between force, pressure and area is given by P=F/A.
    Reason (R): The SI unit of pressure is N/m^2 or Pascal (Pa).

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

13. **Assertion (A):** Fountains of water comes out of the leaking joints or holes in pipes.
    Reason(R): It is because liquids (water) exerts pressure on the walls of the pipes.

    i) Both A and R are true and R is the correct explanation of the assertion.


II.PASSAGE BASED QUESTIONS:

Read the following passage and answer the questions:
In our daily life we perform or observe activities such as opening or shutting a door, lifting or pushing a weight, squeezing a bottle of ketchup, cutting vegetables and making different shapes with clay. All these activities require us to apply some kind of push or pull. A push or pull is also used to hit the striker in a game of carom, kick a football, catch a ball etc., A push or pull that tends to affect an object in some way is called a force and a force arises only when two objects interact. Force has magnitude as well as direction.

i) In which activity one object applies force on another object?
   a) a batsman hitting a cricket ball   b) a chapatti being cooked
   c) a hand of a clock moving   d) a glass of water turning into ice

ii) A person wants to skate using a skateboard. Which two objects should interact in order to move the skate?
   a) Ground and the skateboard   b) Skateboard and wheels of the skateboard
   c) Wheels of the skateboard and foot of the person   d) Ground and the foot of the person

iii) In which activity a force is stopping the motion of an object?
   a) Pushing a cart   b) Hitting a hammer
   c) Kicking a football   d) Catching a cricket ball

iv) Which action is used in riding a bicycle?
   a) Lifting   b) Picking   c) Pushing   d) Throwing

III. a) SHORT ANSWER TYPE QUESTIONS (2 M):

1. Two forces 200N and 300N are acting on a body in same direction. What is the resultant force? (When two or more forces act in the same direction, the net force or the resultant force is the sum of the two forces i.e., 200 N + 300 N = 500 N)
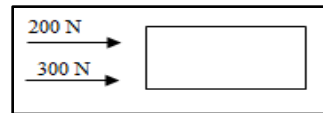
2. What will be the net force on an object if two forces acting on it in opposite directions are equal? Why? (If two forces acting in opposite directions are **equal,** then they cancel each other's effect, hence net force will be zero.)

3. 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, net force is 88-15=73N. The rope will move towards B.)
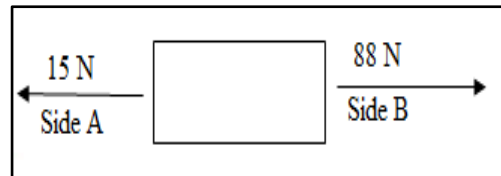
4. Distinguish between force of gravity and gravitational force. (Force of gravity is the earths gravitational pull on a body. It is always attractive in nature. Gravitational force is the force of attraction acting between any two bodies of the universe.)
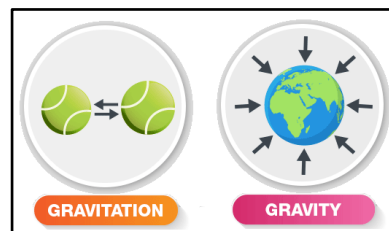
5. a) Why do you think that a ball rolling down the ground come to rest? (It is the force of friction between the surface of the ball and the ground that brings the rolling ball to rest.)
   b) Why does porters place a round piece of cloth above his head before he places his luggage? [This helps in increasing the area of contact between the luggage and his head. The increased area of contact reduces the pressure, enabling him to carry heavy loads.]

III. b) SHORT ANSWER TYPE QUESTIONS (3 M)

1. In a tug of war, three boys of team A pull the rope with forces of 100 N, 120 N and 170N. In team B, the three members pull the rope with forces of 130 N, 150 N and 155 N. Who will win the tug of war? What is the resultant force?
   Force applied by team A = F_A = 100 + 120 + 170= 390 N
   Force applied by team B = F_B = 130 + 150 + 155= 435 N
   As $F_B > F_A$, the resultant force is in the direction of F_B. So, team B will win the tug of war.   Resultant force = F_B - F_A
   = 435 - 390
   = 45 N

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. lifting a bucket of water. Non-contact force-The force applied to a body by another body that is

not in direct contact with it. E.g. A plastic comb gets charged when it is run through dry hair. This charged comb attracts small bits of paper.]

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

BALANCED FORCE	UNBALANCED FORCE
Equal forces acting on one object in opposite directions is called balanced forces.	Unequal forces acting on one object in opposite directions is called unbalanced forces.
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 state of motion of an object. [The state of motion of an object is described by its speed and the direction of motion. The state of rest is considered to be the state of zero speed. An object may be at rest or in motion; both are its states of motion.]

   b) What are the effects of 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 out a toy having a rubber sucker, which is stuck to the wall? [It is difficult , because of difference in internal and external air pressure. There is less air pressure inside than outside, so outside air pressure pushes the surface of rubber sucker towards the wall, making it difficult to pull.]

   b) Why do some people suffer from nose bleeding at high altitudes? (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 our 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. What do the following activities prove?
   [A-Liquid exerts pressure on the walls of the container. B- Pressure exerted by the water at the bottom of the conatiner depends upon the height of the water column. C- Liquid exerts equal pressure at the same depth.]
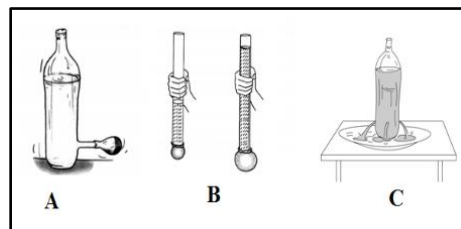
IV. LONG ANSWER TYPE QUESTIONS (5 M):

1. Explain the various types of contact and non-contact forces.
   (Muscular force is the force that is caused by action of muscles inside the body. It is also a contact force. E.g. Athletes use muscular force for running.

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

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 attracting magnetic materials.

Electrostatic force is the force of attraction or repulsion exerted between charged particles. 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 exerted by earth's gravity on all objects. It is always attractive in nature. Falling of apple from tree or falling of any object when we through anything up.)

2. Give reason for the following.

   a) If you walk on the snow, your feet will sink. But if you put on skies, you can move over the snow easily. (Skies increases the area of contact with the snow, thereby reducing the pressure on it. The reduced pressure enables the skies to slide over the snow without sinking much.)

   b) Iron rails of railway track are fixed over wide wooden or concrete sleepers. [Iron rails are fixed over wide wooden or concrete sleepers to reduce pressure received from the train by increasing the area of contact, because if surface area increases pressure decreases and vice versa.]

   c) 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.]

   d) Foundations of high rise buildings are kept wide. [It is because wide foundations increases the area of contact. The increased area reduces the pressure.]

   e) A heavy truck is fitted with six to eight wheels. [A heavy truck is fitted with six to eight wheels because increased area reduces the pressure on wheels so they do not burst or damage on the road. That is why truck has broad tyres so that there is less pressure on the ground and the tyres do not sink.]

   f) It is easy to peel vegetables with a sharp knife. [It is easy to peel vegetables with sharp knife instead of using blunt knife because less area of contact more is the pressure exerted.]

3. a) Calculate the pressure produced by a force of 800 N acting on an area of 2 m^2.
   (P= F/A, 800/2= 400N/m^2)

   b) Over what area should a force of 100 N act to produce a pressure of 500Pascal?
   (A=F/P=100/500=1/5=0.2m^2)

   c) The pressure of a gas contained in a cylinder with movable piston is300 Pa. The area of piston is 50 m^2. Calculate the force exerted on the piston. (F=P xA = 300 x 50 = 15000N)

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