

# St. Andrews Scots Sr. Sec. School

9th Avenue, I.P. Extension, Patparganj, Delhi – 110092

Session: 2022-2023

(Question & Answers)

Class: VIII

Subject: Science

Chapter: Pressure

## Check Point (Page 133)

### 1. State whether the following sentences are True or False.

- Pressure is the force per unit volume - **False**
- Sharp-edged tools exert less pressure on surface - **False**
- A balloon can be easily burst with a spoon than a needle - **False**
- Pointed screwdrivers exert more pressure on a surface - **True**

### 2. Calculate the change in pressure in the following cases.

#### a. When force acting on an area is doubled.

Ans - Let the initial pressure be  $P = F/A$ ,

where  $F$  is the initial force and  $A$  is the initial area.

Now  $F'$  (new force) =  $2F$  and  $A' = A$

So  $P' = F'/A' = 2F/A = 2P$

#### b. When force acting on an area is halved.

Ans - When force acting on an area is halved.

$F' = F/2$  and  $A' = A$

So  $P' = F'/A' = F/2A = P/2$

#### c. When area on which a force acting is halved.

Ans - When the area on which the force is acting is halved.

$F' = F$  and  $A' = A/2$

So  $P' = F'/A' = F/(A/2) = 2F/A = 2P$

#### d. When force acting on area is doubled, while area is halved.

Ans -  $F' = 2F$  and  $A' = A/2$

So  $P' = F'/A' = 2F/(A/2) = 4F/A = 4P$

**e. When force acting on area is halved, while area is doubled.**

Ans -  $F' = F/2$  and  $A' = 2A$

So  $P' = F'/A' = (F/2)/2A = F/4A = P/4$

### Check Point (Page 135)

#### 1. Fill in the blanks.

- Liquids exert **pressure** at the bottom of a container.
- Liquids** acquire the shape of container in which they are poured.
- Liquids exert **equal** pressure at **same** depth within the liquid.
- Pressure inside a liquid **increases** with depth.
- Manometer** is a device used to measure pressures exerted by liquids.

#### 2. Which of the following will exert more pressure on bottom surface

- Half-filled water bottle** or quarter-filled water bottle
- Three-fourth empty water bottle or **one-fourth empty water bottle**.
- One-third filled water bottle** or one-third empty water bottle.

#### 3. Which of the following will exert more pressure on bottom surface of the container?

Ans - A liquid with a difference of 6 cm in height of liquid in two limbs of U-tube has more pressure

### Check Point (Page 137)

#### 1. Fill in the blanks.

- Liquids** and gases exert pressure on the walls of their containers.
- When a balloon inflates, its volume **increases**.
- Atmosphere is a mixture of **gases** called air.
- Barometer** is used to measure atmospheric pressure.
- Rubber sucker sticks on a surface when **pressed**.

#### 2. State whether the following sentences are True or False.

- Gases exert pressure on all the surfaces of a container - **True**
- Air pressure is maximum on Earth's surface - **True**

c. Gases flowing at high speed do not exert pressure - **False**

d. Air molecules exert atmospheric pressure - **True**

### Exercises (Page 138)

#### A. Choose the correct answer.

1. Force is always equal to \_\_\_\_\_.

a. pressure/area    b. area/pressure    **c. area x pressure** ✓    d. area + pressure

2. Which of the following exert pressure on surfaces of their container?

a. Solids    b.  $\frac{1}{2} F$     c.  $\frac{3}{4} F$     **d. F** ✓

3. Which of the following magnitude of force will exert minimum pressure on a given area?

**a.  $2F$**  ✓    b.  $\frac{1}{2} F$     c.  $\frac{3}{4} F$     d. F

4. Unit of pressure has been named after which scientist?

a. Newton    **b. Pascal** ✓    c. Galileo    d. Einstein

#### B. Very short answer questions.

**1. What is the force acting on a unit area known as?**

Ans - Pressure

**2. What is a mixture of gases in atmosphere known as?**

Ans - Air

**3. Name the instrument used to measure air pressure.**

Ans - Barometer

**4. Name the instrument used to measure pressure within liquids.**

Ans - Manometer

**5. What is the shape of glass tube in a manometer?**

Ans - U-shape

#### C. Short answer questions. (Page 138)

**1. What is atmospheric pressure? Define the relationship between force and pressure.**

Ans - The pressure exerted on the Earth's surface by all molecules of gases present in the atmosphere taken together is called atmospheric pressure.

Atmospheric pressure = Force exerted by atmosphere on Earth/Surface area of the Earth.

**2. Why is the tip of a screwdriver made flat and sharper?**

Ans - The sharper end of the tip helps in exerting large pressure even for a smaller force applied.

**3. Describe with the help of an example that liquids exert pressure on bottom surfaces of the container.**

Ans - Stretch your hands with palms open. Ask your friend to keep an empty plastic water bottle on your left palm and a water filled bottle on your right palm. You would feel some pressure on your right palm. The pressure exerted by the water filled bottle on hand appears much more than the empty bottle. Replace the water in the bottle with an oil and repeat the activity. You would still feel the pressure. This confirms that all the liquids exert pressure on the bottom of the container.

**4. Why do buses and trucks have wider tyres?**

Ans - Heavy vehicles like trucks and buses have double tyres to reduce the pressure exerted by them on the ground.

**5. Why does a balloon inflate on blowing air in it?**

Ans - The size of the balloon increases when air is pushed inside it. It happens because the air inside the balloon exerts of the balloon. Further, the whole balloon gets stretched and acquires a spherical shape as the pressure exerted by air is equal in all the directions.

**6. Why can a camel walk easily on sand but not a horse?**

Ans - A camel can walk easily on sand but not a horse because a camel has broader feet than a horse because of which the pressure exerted on the same is less for the same force applied.

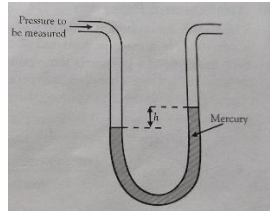
**D. Long answer questions. (Page 139)**

**1. In how many ways can a brick be kept on a flat surface? In which case will the force exerted on the surface be minimum and why?**

Ans - A brick can be laid on a flat surface in two ways: horizontally and vertically. Since the pressure applied is inversely proportional to the area of the object, so the brick in the horizontal position has larger surface area in contact with the flat surface will exert less pressure for the same value of weight.

**2. Describe the construction of a manometer.**

Ans - Manometer is a device used to measure the pressure exerted by liquids. It consists of a vertical U-shaped glass tube filled with mercury or any other liquid, mounted on a stand against a marked scale. One end of the U-tube is left free, while the other end is connected to a flexible tube. The far end of the flexible tube is joined to the point where pressure inside a liquid has to be measured.



Manometer

### 3. List the factors on which the pressure exerted by a liquid depends.

Ans -The pressure exerted by the liquid depends on:

- The pressure exerted by a liquid is directly proportional to the height of the water column.
- The pressure exerted by a liquid increases with the depth.
- The pressure due to a liquid is directly proportional to its density. For example, water exerts more pressure than vegetable oil as oil is less denser than water.
- The pressure exerted by a liquid is independent of the size and shape of the container.

### Let's Think (Page 139)

#### 1. Why cannot human beings dive deep under water without any protective equipment?

Ans - Water is nearly 800 times denser than air and much heavier. As you dive deeper and deeper, the force of all that water can do funny things to your body. The weight of the water above a diver exerts pressure on his/her body. The deeper a diver descends, the more water he/she has above him/her and the more pressure it exerts on his/her body. The pressure a diver experiences at a certain depth is the sum of all the pressures above him/her, both from the water and air. Increased pressure underwater also affects how we breathe. At depth, pressure compresses the lungs. Divers take in more air as they descend, and their bodies absorb more nitrogen the deeper they go.

#### 2. Why is one not open windows of airplane when flying in it?

Ans - The difference in the pressure is created. Inside the aeroplane, the pressure is kept high (so that we have enough oxygen to breathe) whereas at high altitudes the pressure outside is very low. So if we open the windows of the aeroplane, we will be pushed out by the high pressure inside to out of the plane.

#### 3. What are the consequences of high blood pressure in human body?

Ans - Possible health consequences that can happen over time when high blood pressure is left untreated include:

- Damage to the heart and coronary arteries, including heart attack, heart disease, congestive heart failure, aortic dissection and atherosclerosis (fatty build ups in the arteries that cause them to harden)

Stroke

- Kidney damage

- Vision loss
- Memory loss
- Fluid in the lungs
- Angina
- Peripheral artery disease