

## Class 8 Chapter 11 Pressure

### A. Give reasons for the following:

Q.1 Needles have a sharp point.

Ans: Needles have a sharp point so that they can easily pierce through materials like cloth, skin, or fabric with less force and without causing much damage.

Q.2 A balloon bursts when too much air is blown into it.

Ans: Because blowing more air increases the pressure inside the balloon, the balloon's elastic surface stretches to a limit. When the pressure becomes too high and the surface cannot stretch anymore, it bursts.

Q.3 We have to put an effort to push down an open and inverted glass bottle into a bucket full of water.

Ans: Air trapped inside the bottle presses upwards because it cannot escape. This trapped air creates pressure that opposes pushing the bottle down, so we need to apply effort to overcome this pressure.

Q.4 Atmospheric pressure reduces as we go up in altitude.

Ans: At higher altitudes, there are fewer air molecules above us, so the weight of the air (and thus pressure) decreases as we go higher.

### B. Give one word for the following:

Q.1 The SI unit of pressure

Ans: Pascal (Pa)

Q.2 Pressure exerted by an object by the weight of the air above it

Ans: Atmospheric pressure

Q.3 Height above sea level

Ans: Altitude

Q.4 General name for an instrument used to measure pressure

Ans: Manometer

### III. Short Answer Type Questions

Q.1 What is 'pressure' in physics?

Ans: Pressure is the force applied per unit area on a surface. It is calculated by dividing the force by the area over which it acts.

Q.2 Do fluids exert pressure? In what direction?

Ans: Yes, fluids (liquids and gases) exert pressure equally in all directions.

Q.3 What is the approximate value of atmospheric pressure on the surface of the Earth at sea level?

Ans: About 101,325 Pascals (or 1 atmosphere)

Q.4 Name the instrument used to measure atmospheric pressure.

Ans: The instrument used to measure atmospheric pressure is called a barometer.

Q.5 How does atmospheric pressure vary with altitude?

Ans: Atmospheric pressure decreases as altitude increases.

Q.6 How does the pressure in a liquid vary with depth?

Ans: Pressure in a liquid increases with depth because the weight of the liquid above increases.

#### IV. Long Answer Type Questions

Q.1 Describe an activity to show that the pressure produced increases when the surface area is decreased, for the same force applied.

**Ans:**

**Activity:** To demonstrate that pressure produced on a surface increases when the same force is applied over a smaller area.

**Materials Needed:**

- a) A block or book with flat surfaces of different sizes (e.g., a rectangular block)
- b) Soft clay or dough
- c) A weighing scale (optional, to apply consistent force)

**Procedure:**

- a) Take the block and place it on a soft clay surface with its **larger face** touching the clay.
- b) Press the block gently but firmly onto the clay with the same amount of force each time (you can press using your hand or place a known weight on it).
- c) Observe and measure the area and depth of the impression (mark) left on the clay.
- d) Now, turn the block so that the **smaller face** touches the clay.
- e) Press the block again with the same force as before.
- f) Observe the impression left this time.

**Observation:**

- a) When the larger face is pressed, the impression on the clay is shallow and covers a bigger area.
- b) When the smaller face is pressed with the same force, the impression is deeper and covers a smaller area.

**Conclusion:**

Since the force applied is the same, but the surface area is smaller in the second case, the pressure exerted on the clay is higher. This shows that **pressure increases when the surface area decreases for the same applied force** ( $\text{Pressure} = \text{Force} \div \text{Area}$ ).

Q.2 Briefly outline an activity to demonstrate the presence of atmospheric pressure.

**Ans: Activity:** To show that atmospheric pressure can hold water inside an inverted glass using a card.

**Materials Needed:**

- a) A glass tumbler (transparent)
- b) Water
- c) A thin card or stiff paper (slightly bigger than the mouth of the glass)

**Procedure:**

- a) Fill the glass completely with water.
- b) Place the card flat on the mouth of the glass, making sure it covers the opening fully.
- c) Hold the card firmly in place with your hand.
- d) Quickly invert the glass while holding the card, so the glass is upside down.
- e) Slowly remove your hand supporting the card.

**Observation:**

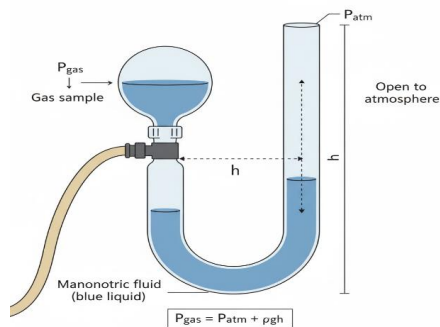
The card stays in place, and the water does not fall out of the glass.

**Explanation:**

The atmospheric pressure acting upwards on the card is greater than the downward pressure of the water inside the glass. This prevents the water from falling and holds the card tightly against the mouth of the glass, demonstrating the presence and force of atmospheric pressure.

Q.3 Draw a simple diagram and explain the working of an open-tube manometer.

Ans:



### Explanation:

An open-tube manometer consists of a U-shaped tube partially filled with mercury (or any liquid). One end is open to the atmosphere, and the other end is connected to the gas whose pressure is to be measured. The difference in mercury levels shows the pressure difference between the gas and atmospheric pressure.

Q.4 Why are dams thicker at the base than at the top?

Ans: Dams are built to hold back large amounts of water, which exerts pressure on the dam structure. This pressure is called **water pressure** and it depends on: **Depth of the water**

The deeper you go under water, the more water there is above pushing down. This means the pressure at the bottom of the dam is much greater than at the top. This pressure is due to the **water pressure** above the point you are considering.

Since the base of the dam holds back the deepest water, it experiences the **maximum pressure**.

- a) To **resist the large pressure at the bottom**, the dam needs to be made **thicker and stronger at the base**. This extra thickness helps it withstand the powerful force of water trying to push it over or break it.

Q.5 Describe two everyday applications where the area over which a force is applied is reduced in order to increase the pressure produced.

Ans: **1. Using a Knife to Cut Food**

- a) A knife has a very thin, sharp edge, which means the area of contact between the knife and the food is very small.
- b) When you apply force to cut, this small area causes a **large pressure** on the food, making it easier to cut through even tough items like vegetables or meat.
- c) If the knife had a wide, blunt edge, the pressure would be less, and cutting would be difficult.

### 2. High-Heeled Shoes

- a) High-heeled shoes have a small surface area at the heel compared to flat shoes.
- b) When a person stands or walks, their weight (force) is concentrated on this small heel area.
- c) This increases the pressure on the ground under the heel, which is why high heels can leave marks on soft surfaces like grass or sand.