# WORKSHEET 2

## CHAPTER 6 – BUOYANCY AND ARCHIMEDES' PRINCIPLE

### A. Tick (✓) the correct option.

1. Density of a substance is inversely proportional to its
   a. mass. b. volume. c. thrust. d. none of these.
2. Buoyant force is inversely proportional to the
   a. density of fluid. b. gravity. c. temperature. d. none of these.
3. 1 pascal is equal to
   a. 10 $N/m^2$. b. 100 $N/m^2$. c. 1000 $N/m^2$. d. 1 $N/m^2$.
4. Pressure exerted by a force of 10 N on an area of 5 $m^2$ is
   a. 2 Pa. b. 4 Pa. c. 10 Pa. d. none of these.
5. The pressure acting on a body and force are
   a. inversely proportional. b. directly proportional. c. constant. d. none of these.

### B. Fill in the blanks.

1. Any substance which has no fixed shape and has the ability to flow is called a _____
2. Pressure due to the liquid at a point on the surface of the liquid is _____
3. The tendency of a fluid to exert an upward force on an object placed in it is called _____
4. Buoyant force is _____ proportional to the acceleration due to gravity.
5. The SI unit of density is _____

### C. State whether the following statements are true or false.

1. If the density of water is more than the density of body, it will float on the surface of water.
2. Buoyant force is inversely proportional to the density of the fluid.
3. Archimedes principle is used in designing submarines.
4. The SI unit of density is $kg/m^3$.
5. Buoyant force decreases as depth increases.

### D. Match the following.

| | |
|---|---|
| 1. Thrust | no units |
| 2. Relative density | density of body/density of liquid |
| 3. Principle of floatation | $kg/m^3$ |
| 4. Density | newton |
| 5. Buoyant force | $V\rho g$ |

Name: ..... Teacher's signature: .....

Class: IX Date: .....

## E. Answer the following questions.

### Very short answer questions

1. Define metacentre.
2. Write any two characteristics of a floating body.

### Short answer questions

1. What is relationship between density and relative density?
2. What will happen if the weight of the body is less than the buoyant force?

### Long answer questions

1. Why do skiers use long flat skis to slide over snow?
2. The volume of 100 g of substance is 40 $cm^3$. If density of water is 1 $g/cm^3$, will the substance float or sink?

# ANSWERS

## WORKSHEET 2

### A. Tick (✓) the correct option.

1. b
2. c
3. d
4. a
5. b

### B. Fill in the blanks.

1. fluid
2. zero
3. buoyancy
4. directly
5. $kg/m^3$

### C. State whether the following statements are true or false.

1. T
2. F
3. T
4. T
5. F

### D. Match the following.

| | |
|---|---|
| 1. Thrust | newton |
| 2. Relative density | no units |
| 3. Principle of floatation | density of body/density of liquid |
| 4. Density | $kg/m^3$ |
| 5. Buoyant force | $V\rho g$ |

### E. Answer the following questions.

**Very short answer questions**

1. Metacentre is the point where the vertical line passing through new centre of buoyancy intersects the original line passing through the centre of gravity and original centre of buoyancy. It is denoted by the letter M.
2. a. The weight of the solid is equal to the weight of the liquid displaced by the immersed part of the solid.
   b. The weight of the solid acts vertically downwards through the centre of gravity whereas buoyant force acts vertically upwards through the centre of buoyancy.

**Short answer questions**

1. Density of a solid = R.D. of the solid .

   Density of water (in SI unit)

   = R.D. of the solid × 1000 $kg/m^3$

   Density of a solid = R.D. of the solid x Density of water (in CGS unit)

   = R.D. of the solid × 1 $g/cm^3$
2. When weight of the body is less than the buoyant force, then the body will float partially above the surface of the liquid.

**Long answer questions**

1. Due to the long flat skis, the area of contact is larger. This reduces the pressure exerted by the skier on the snow; enabling the skier to slide over the snow without sinking.

2. Volume of substance = 40 $cm^3$

   Mass of the substance = 100 g

   Density of the substance = $\frac{\text{Mass}}{\text{Volume}}$

   = $\frac{100}{40}$ = 2.5 $g/cm^3$

   Density of water = 1 $g/cm^3$

   Thus, density of the substance is 2.5 $g/cm^3$. Since the density of the substance is much higher than the density of water (1 $g/cm^3$), the substance will sink in water.