Class 8

Subject : Physics

Topic. : Physical quantities and measurement.

Worksheet

Short answer type questions

1. **What is density? State its units**

   Density is defined as the ratio of the mass of a body to its volume

   Density= mass / volume

   SI unit : kg per cubic metre

2. **Name the principle which gives the magnitude of buoyant force acting on a solid body immersed in**

   Archimedes'Principle

3. **Where does a solid weighs more in air or in a liquid?**

   A solid weighs more in air then in a liquid because liquids have upward buoyant force.

4. **What is the density of water in SI units.**

   Density of water is 1000 kg per metre cube.

5. **State Archimedes principle.**

   If a body is partially or fully immersed in a fluid it experiences an upthrust and thus an apparent loss in weight , wherein the loss in weight is equal to the weight of the fluid displaced by the submerged part of the body.

Or

Any body partly or wholly immersed in a liquid experiences an upward force called upthrust or buoyant force which is equal in magnitude to the weight of the liquid displaced by the body.

Long answer type questions.

1. **When does a body floats in a liquid?**

A body floats in a liquid when its density is less than the density of the liquid.

When does a body sink in a liquid?

A body sings in a liquid when its density is greater than the density of the liquid

2. **Explain the method applied for determining the density of a solid (regular or irregular) and that of a density of a liquid.**

Determining the density of of solids (regular or irregular)

- **To determine the density of a solid we need to to find out the mass and the volume of the solid. If it is a regular solid like a cube a cylinder then the**

sides are measured and the volume is calculated but for an irregular solid and Eureka can is used.

- And Eureka can is filled with water till the spout , when the irregular solid is dipped in water the excess water flows out which is collected in the measuring cylinder which helps us to calculate the volume of the displaced water due to the irregular solid Volume of irregular solid= volume of liquid displaced.

- The mass of the solid is measured using and electronic balance.
- The density is calculated using the relation. D=M/V.
  Determine the density of a liquid
- Dry clean density bottle is weight in an electronic balance.
- Then the density bottle is filled until it is completely full and the stopper is inserted .It is a gain weighed.
- The difference between the weights of the filled bottle and

the dry bottle gives us the mass of the liquid taken.

- The volume of the bottle gives the volume of the liquid taken.
- The density of the liquid can be now calculated using the formula.

3. **Boats and ships are floating objects explain.**

   Boats and ships have average density less than that of water because of the shape of the boats and ships. Most of the space in the boats n ship is empty and the average density of the boats and ships become less than 1000 kg per metre cube.

Hence large boats and ships float in water.

4. **Complete exercises.**
   C,D,E,F,G,H,I,J (Q2,6,7,9).

C: Pick the correct one

1. Easier
2. Light
3. Rises
4. Decreases,weight
5. Kg per metre cube

D : Fill in the blanks

1. More

2. Mercury
3. Higher, higher
4. Expands, decrease

E: Define the following terms

1. International load line: plimsoll line on the international load line is a reference mark located on the ships HAL that indicates the maximum depth to which the vessel may be safely emerged when loaded with cargo.
2. Volume: the space occupied by matter called volume.

F: Mark the statements true or false

1. False
2. True
3. True
4. False
5. False

G: Choose the odd one out giving reasons

1. Density is a physical quantity others are States of matter
2. Mass is a physical quantity others are faces of matter
3. Iron nail sings others float in water
4. Aeroplane flies in air

5. Pressure is it different physical quantity than others

H: Match the following

1. Units of measurement- mass length and time
2. Mercury-metal
3. Density of irregular solids-Eureka can
4. International load line-plimsoll line
5. Boats and ships-floating objects

I: Give one word for the following

1. International load line.

2. Buoyant force
3. Density
4. Archimedes' principle.

Q2. Mass of plastic = 160 g

Volume occupied = $320\ cm^3$

$\therefore$ Density of plastic = $\frac{\text{Mass}}{\text{Volume}}$

$= \frac{160}{320} = 0.5\ g\ cm^{-3}$

SI unit $= 0.5 \times \frac{1}{1000}\ kg \times \frac{1\ m^{-3}}{\frac{1}{100} \times \frac{1}{100} \times \frac{1}{100}}$

$= 0.5 \times \frac{1}{1000} \times 1000000$

$= 500\ kg\ m^{-3}$ Ans.

Q6. Density of gold = $19.3\ g\ cm^{-3}$

Volume of solids = $6cm \times 4cm \times 2cm = 48\ cm^3$

Density = $\frac{\text{Mass}}{\text{Volume}}$

$\therefore$ Mass = Density × Volume

$= 19.3 \times 48\ g$

$= 926.4\ g$ Ans

Q7. Volume of Boulder = $27000\ cm^3$

Density of granite = $2.8\ g\ cm^{-3}$

$\therefore$ Mass of granite = Density × Volume

$= 27000 \times 2.8$

$= 75600\ g$. Ans

Q9. Volume of nugget = $2 \times 2 \times 2 = 8\ cm^3$

Mass of nugget = 40 g

Density of nugget = $40/8 = 5\ g\ cm^{-3}$

Density of gold is $19.6\ g\ cm^{-3}$, so nugget is not Gold