15/5/21

# ASSIGNMENT - 1



Date
Page

1. Define the term density of a substance.

Ans- The density of a substance is its mass per unit volume.

Density of a substance - mass of substance / volume of substance

2. Name the SI unit of density ? How is it related to $gcm^{-3}$ ?

Ans- The S.I unit of density is

* Kg per metre$^3$ = S.I unit of density
$= Kg / m^3$
$= Kgm^{-3}$

* CGS unit = Centimetre - Gram - Second
$= gcm^{-3}$

* SI and CGS unit of density = $1 kg m^{-3}$
$= \frac{1}{1000} gcm^3$
$= 10^{-3} g cm^{-3}$

3. The density of a brass is $8.4\ gcm^{-3}$. What do you mean by this statement?

Ans- The density of a brass is 8.4 gcm -3. This statement means that the brass has mass of 8.4 g per 1 cubic centimetre volume.

4. Arrange the following substances in order of their increasing density:

Iron, cork, brass, water, mercury

Ans- Cork, water, Iron, brass, ~~mercury~~ mercury.

5. How does the density of a liquid (or gas) vary with temperature?

Ans- In general matter expands on heating and contracts on cooling. But there mass doesn't change. So, the density of a substance decreases with increase

in temperature and increases with the decreases in temperature.

But water shows anomalous behaviour. Water contracts on heating from 0°C to 4°C and expands on heating above 4°C. So, the density of water increases from 0°C to 4°C and then decreases above 4°C. In other words Density of water is maximum at 4°C equal to 1 $gcm^{-3}$ or 1000 $Kg\ m^{-3}$.

6. A given quantity of a liquid is heated. Which of the following quantity will vary and how?

a) mass b) volume c) density

Ans- a) Mass - no change.

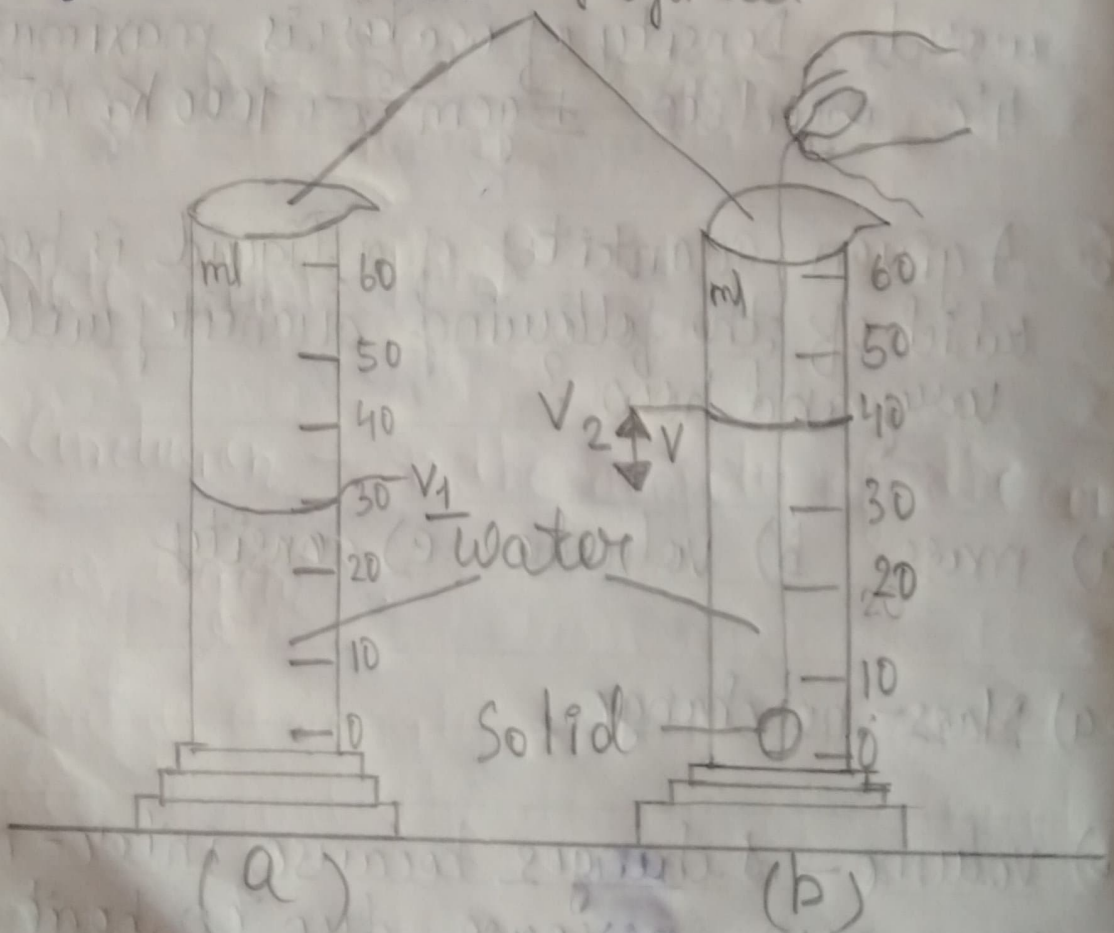
b) volume - changes because inter-molecular space are increase due to heat.

c) density - changes due to change of volume on heat.

7. Describe an experiment to determine the density of the material of a coin.

Ans- * Aim :- To determine the density of the material of a coin.

* Materials required :- Coin, a measuring cylinder.




Measurement of volume of a solid using a measuring cylinder.

Date
Page

*Procedure :-

- The mass of the coin was measured by a common beam balance. The mass was noted and let it be M gram. (M=50 g)
- A measuring cylinder was taken, and it was partly filled with water.
- The level of water was noted that is $V_1 = 30\ cm^3$.
- Now, the given coin was tied with a thread and it was gently lowered in a water contain in the measuring cylinder as in the figure B. It was taken care that no water splash out Splashed out. The level of water was again noted and let it was $V_2 = 40\ ml$.
- The difference $V_2 - V_1$ was found that

$$V = V_2 - V_1$$
$$= 40 - 30$$
$$= 10\ cm^3$$

- The density of the cube was calculated by the formula -

$$\text{Density} = \frac{\text{mass}}{\text{Volume}} = \frac{M}{V} = g.cm^{-3}$$

- Here, $M = 50\,g$

$V = 10\,cm^3$

$$D = \frac{50\,g}{10\,cm^3} = 5\,g\,cm^{-3}$$

Note: $1ml = 1\,cm^3$

* Conclusion :- So, the density of the coin is $5\,g\,cm^{-3}$.

8. Describe an experiment to determine the density of a liquid.

Ans- * Aim :- To determine the density of a liquid. (milk)

* Materials required :- a beaker, a measuring cylinder and milk.

* Procedure :-

- A beaker was taken and the mass of the beaker was measured by a common beam balance. Let the mass of the beaker be $M_1$.

- A measuring cylinder was taken and milk was poured into it to a certain level, let it be 50 ml. So, the volume of the milk is $V = 50$ ml or $50\ cm^3$.

- The milk was transferred into the empty beaker and its mass was again measured. Let the mass of the beaker with milk

is $M_2$ g.

. The difference coas found into $-M_1$ which gave the mass of the milk that is $M = (M_2 - M_1)$ g

= Let $M = 51.5$ g.

* Conclusion :-

. The density of the milk was calculated by the following formula:

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

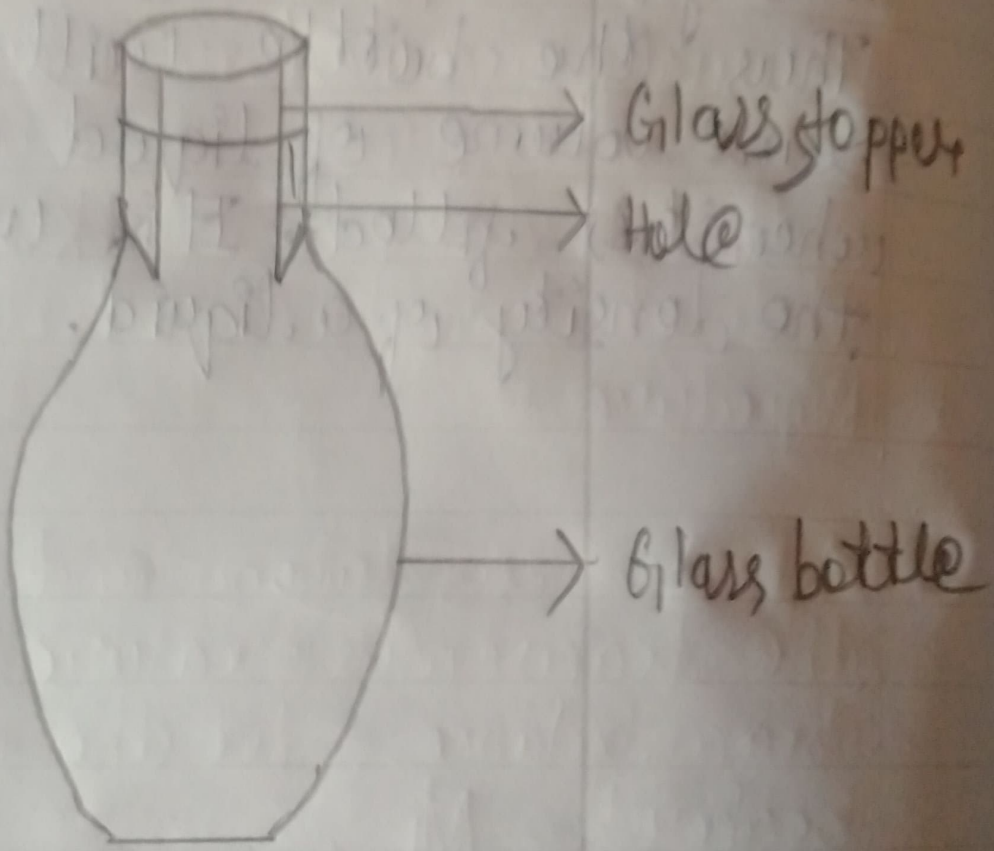
$$= \frac{51.5\ g}{50\ cm^3} = 1.03\ g\,cm^{-3}$$

9. What is a density bottle? How is it used to find the density of a liquid?

Ans- *A density bottle is a specially designed bottle used to determine the density of a liquid.

Date
Page

* Generally the volume of bottle is 25 ml or 50 ml. stoppere has a narrow hole through it. When bottle is filled with liquid and stopper is inserted, The Excess Liquid rises through the Hole and drains out. Thus the bottle will contain the same volume of liquid each time when it is filled. It is used to determine the density of a liquid.




(DENSITY BOTTLE)