① Define the term density of a substance

ans) Density is a measure of mass per volume.

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

ans) The SI unit of density is Kgm^{-3}

$$1Kgm^{-3} = \frac{1Kg}{1m^3} = \frac{1000g}{(100cm)^3}$$

$$= \frac{1}{1000} gcm^{-3} =$$

$$1Kg\,m^{-3} = 10^{-3} gcm^{-3}$$

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

ans) The density of brass is $8.4 gcm^{-3}$ This means that the density of brass is $8.4 g/cm^3$ it means that $1 cm^3$ of brass has a mass of 8.4g.

4) Arrange the following substance in order of their increasing density?
Iron, cork, Brass, Water, Mercury

~~Solid → Cork, Iron, Brass~~
~~Liquid → Water, Mercury~~

Cork, Water, Iron, Brass, Mercury

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

As the temperature increases, volume of most of the liquids also increases and when the volume increases density decreases. Similarly the when the temperature decrease the volume of most of the liquids also decreases and the density increases. However the water show anomalous behaviour. Water has maximum volume at 4°C and maximum density at 4°C but ~~the~~ when water is cooled down further, its volume starts increases and the density of water decreases. When cool further below than 4°C.

Hence the density of water is maxium at 4°C

at $1 g cm^{-3}$ or $1000 kg m^{-3}$

(6) A given quantity of liquid is heated which of the following quantity will vary and how? (a) mass (b) volume. c) density ?

When a given quantity is of liquid is heated

(a) mass → Doesn't change
(b) volume → Changes and increases with a rise of temperature
(c) density → Changes and decrease

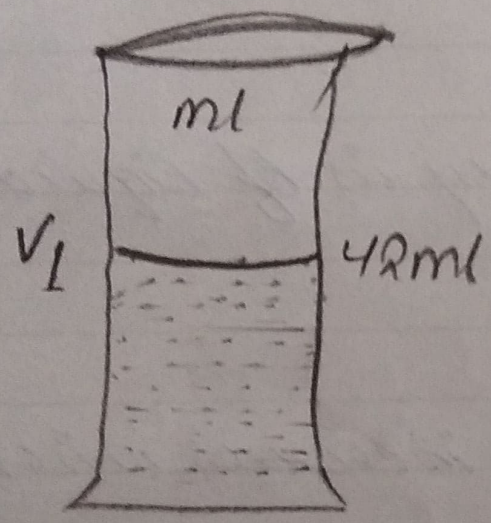
$$d = \frac{M}{V}$$

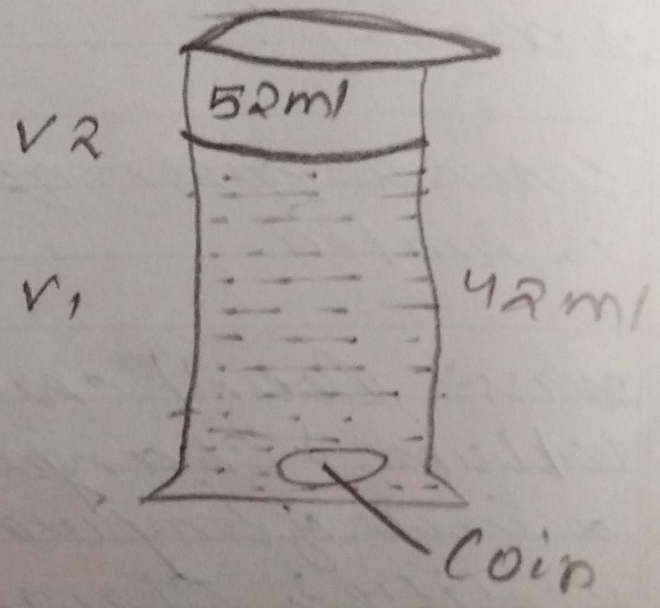
(7) Describe an experiment to determine the density of the material of coin

To find the density of the material of coin we need to first find the mass by a common beam balance and its volume by measuring cylinder.

To measure the coin

Let the mass of coin shown by a beam balance = 50g





To measure the volume of the coin

Initial volume of water = V_1 = 42ml

Volume of water

When a coin is added in the cylinder = V_2
= 52ml

Then volume of coin = $V_2 - V_1 = 52 - 42$
$= 10\,m$

Mass of a coin = 50g

Volume
Mass of the coin = $10m = 1000cm^3$

$$\text{Density} = \frac{m}{V} = \frac{50\,g}{1000cm^3} = 0.05\,g\,cm^{-3}$$

(B) Describe an experiment to determine the density of liquid.

We need to find the volume of liquid i.e milk and mass of liquid

Mass of milk

Weight of an empty beaker - $M_1 g = 70g$

Fill the beaker with milk and weight again $= M_2 g = 116g$

Volume of milk

Transfer the milk into a measuring cylinder and weight again the volume = $10cm^{-3}$

density of milk $= \rho = \frac{m}{v}$

$\Rightarrow \frac{m}{v} = \frac{m_2 - m_1}{40} = \frac{116 - 70}{40} = \frac{46}{40} = \frac{4.6}{4}$

$= 1.15\ g\,cm^{-3}$

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

Density bottle is a small glass bottle which has a glass stopper at its neck. The bottle can store a fixed volume of a liquid. Generally the density bottle comes in two sizes 25ml or 50ml. The glass stopper has a narrow hole in it. When the bottle is filled with liquid and a 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