

14/5/21
CW

Physics

Assignment - I

1) Define term density of a substance.

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

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

-Ans. SI unit of Density is kg m^{-3}

The SI unit and gcm^{-3} is related.

$$\text{Eg} \rightarrow 1 \text{ kg m}^{-3} = \frac{1 \text{ kg}}{1 \text{ m}^3} = \frac{1000 \text{ g}}{(100 \text{ cm})^3}$$

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

$\text{gcm} = \text{Gram centimeter}^3$

3) The density of Brass is 8.4 gcm^{-3} what do you mean by this statement?

-Ans. From the statement The density of Brass is 8.4 gcm^{-3} we get to know that 1 cm^3 of Brass is equal to 8.4 g .

4) Arrange the following substances in order of their increasing Density (Iron, cork, Brass, water, Mercury)

-Ans. Cork \rightarrow water \rightarrow Iron \rightarrow Brass \rightarrow Mercury

5. Liquid - As the temp. increases, volume of liquid also increases thus the density of liquid decreases.

Gas - As the temp. increases, the molecules of gases move faster and push each other apart similar to liquid.

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

Ans. (c) Density will vary

Because, As we know that temperature ~~of~~ density of any substance ~~is~~ from this theory we know that if liquid is heated the temp will increase and the density will decrease.

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

Ans. Mass of coin be = M

Take a cylinder partially filled with water and a coin tied with string

Measure the readings V_1 of water in cylinder

Now, dip the coin into cylinder and mark water level = V_2

Thus,

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

$$\text{Density of coin} = \frac{M(\text{Mass})}{(V_2 - V_1)} = (\text{Density})$$

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

Ans let's take a liquid = Milk

i) Take a Beaker measure mass of empty Beaker using Beam Balance let mass be m_1 gram.

ii) Now take a cylinder and pour milk into it till 50 mL Volume = 50 ml or 50 cm³

iii) Transfer milk into empty beaker measure the mass again. Mass of beaker with milk = M_2 gram.

iv) Difference = $M_2 - M_1$ Mass = M of milk let, m_e
= 51.5 gram

v) Calculate the density of milk

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

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

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 which is used to determine the density of a liquid.

i) Measure the dried bottle with Beam Balance.

ii) Fill the bottle with water. Measure its mass again let the mass be M_2 g.

iii) Empty the bottle and dry it now fill the bottle with liquid (given one) measure its mass again = M_3 g (mass).

iv) ~~Density~~ Calculate the density.

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

$$= \frac{(M_3 - M_1) \text{ g}}{(M_2 - M_1) \text{ cm}^3}$$

Mass of ^{Bottle} ~~water~~ = 30 g (M_1)

Mass of water = 60 g (M_2)
(Bottle)

Mass of liquid = 54 g (M_3)

Mass of liquid = 54 g - 30 g = 24 g

Volume of liquid $V = 60 - 30 \text{ cm}^3$

$$\text{Density} = \frac{M}{V} = \frac{24 \text{ g}}{30 \text{ cm}^3} = 0.8 \text{ g cm}^{-3}$$