

H2O
2.08.24
2.08.23

HOME ASSIGNMENT (Physics)

1. The mass of 10 cm^3 of silver is 103 gm .

Find

(a) The density of silver in kg/m^3

(b) Relative density of silver.

Given,

$$\text{Mass of silver} = 103 \text{ gm}$$

$$\text{Mass of silver in kg} = \frac{103}{1000} \text{ kg}$$

$$\text{Volume of silver} = 10 \text{ cm}^3$$

$$\text{Volume of silver in m}^3 = \left(\frac{10 \times 1}{10^6} \right) \text{ m}^3$$

$$\text{Density of silver} = \frac{103 \times 10^{-3} \text{ kg}}{10 \times 10^{-6} \text{ m}^3}$$

$$= 10300 \text{ kg m}^{-3}$$

$$\text{Density of water} = 1000 \text{ kg m}^{-3}$$

$$\text{Relative density of silver} = \frac{10300 \text{ kg m}^{-3}}{1000 \text{ kg m}^{-3}}$$

$$= \frac{\text{Density of silver}}{\text{Density of water}}$$

$$= \frac{10300 \text{ kg m}^{-3}}{1000 \text{ kg m}^{-3}}$$

$$= 10.3$$

Hence, the density of silver is 10300 kg m^{-3} and the relative density of silver is 10.3

2. A piece of wood of mass 150 g has a volume of 200 cm^3 . Find the density of wood in C.G.S. unit and S.I. unit.

Given,

Mass of the piece of wood = 150 g

Mass of the piece of wood in kg = $\frac{150 \text{ kg}}{1000}$

Volume of the piece of wood = 200 cm^3

Volume of the piece of wood in m = $\left(\frac{200 \times 1}{10^6}\right) \text{ m}^3$

Density of the piece of wood in C.G.S. unit = $\frac{150 \text{ g}}{200 \text{ cm}^3}$
 $= 0.75 \text{ g cm}^{-3}$

Density of the piece of wood in S.I. unit =
 $= \frac{150 \times 10^{-3} \text{ kg}}{200 \times 10^{-6} \text{ m}^3}$
 $= 750 \text{ kg m}^{-3}$

∴ Hence, the density of wood in C.G.S. and S.I. unit are 0.75 g cm^{-3} and 750 kg m^{-3}

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

Any substance belonging to liquid or gaseous state, when given or it generates kinetic energy, their

inter molecular distance increases because of their reduction in inter molecular forces of attraction between the particles as they ~~and~~ undergo random motion. Due to these changes, the volume increase, ~~so~~ where variations in variation of their density is found or their density increases.

4. Define the term relative density of a substance. What is the unit of relative density?

The relative density of a substance is defined as the ratio of the density of substance to that of a given reference material, density of water.

$$\text{Relative density} = \frac{\text{Density of substance}}{\text{Density of water}}$$

As it is a ratio, so, it has no unit. It is unitless.

5. How does the density of a body and that of a liquid determine whether the body will float or sink into that liquid?

The density of a body and that of a liquid determine whether the body will float or sink into that liquid is as follows :-

(i) If the body is more dense than that of a given liquid, then it will sink in which it is placed,

it will sink.

(ii) If the body is less dense than that of the given liquid in which it is placed, placed, it will float.

6. What is the law of floatation?

The principle of floatation states that when an object floats on a liquid the buoyant force that acts on the object is equal to the weight of the object.

* The law of floatation is also known as the Archimedes principle.

~~Question~~ Question: The diagram given below shows a body floating in three different liquids A, B, and C at different levels.



(a) In which liquid does the body experience the greatest buoyant force? In all liquids.

(b) Which liquid has the least density? Liquid A

(c) Which liquid has the highest density? Liquid C.