Home Assignment -1

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1) The density of alcohol is 600 kg/m^{-3}. Express it in g.cm^{-3}

2) A piece of wood of mass 150 g has a volume of 200 cm^3. Find the density of the wood in (a) CGS unit

(b) SI unit.

3) Calculate the density of solid from the following data:

a) Mass of solid (M) = 72 g

b) Initial volume of water in measuring cylinder = 24 ml (V^1)

c) Final volume of water when solid is completely immersed in water = 42 ml (V^2)

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

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

Answers

1) $\frac{1\ kg}{m^3} = \frac{1}{1000}\ \frac{gm}{cm^3}$

$\Rightarrow 600\ \frac{kg}{m^3} = \left[\frac{1}{1000} \times 600\right] gm/cm^3$

$= 0.6\ gm/cm^3$

2) Mass = 150 g

Volume = 200 cm^3

i) Density in CGS unit = $\frac{M}{V} = \frac{150}{200}\ g = 0.75\ g\,cm^{-3}$

ii) Density in SI unit = $(0.75 \times 1000)\ kg\,m^{-3}$

$= 750\ kg\,m^{-3}$

3) Volume = $V^2 - V^1 = 42 - 24\ ml = 18\ ml / 18\ cm$

Mass = 72 g

Density = $\frac{M}{V} = \frac{72\ g}{18\ cm} = 4\ g\,cm^{-3}$

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4) The density of the liquid (or gas) is directly varied when the temperature changes. As the temperature increases, density of most of the liquids also increases and when the temperature decreases the density of the liquids also decrease.

5) Density bottles are mainly used to determine the density of liquids of moderate viscosity.

Home Assignment - 2

1) The mass of a density bottle is 35g when empty, 65 g when filled with water and 59g when filled with alcohol. find the relative density of alcohol.

2) Distinguish between density and relative density.

3) Explain the meaning of the statement 'Relative density of aluminium is 2.7.'

4) The mass of an empty density bottle is 21.8g, when filled completely with water it is 41.8 g and when filled completely with liquid it is 40.6g. Find :-

a) The volume of density bottle.

b) The relative density of liquid.

5) From the following observations calculate the density and relative density of a brine solution.

a) Mass of empty density bottle = 22g

b) Mass of bottle + water = 50g

c) Mass of bottle + brine solution = 54g.

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Answer

1) Mass of the empty bottle = 35g
Mass of bottle + water = 65g
Mass of bottle + alcohol = 59g
Mass of water = (65-35)g = 30g
Mass of alcohol = (59-35)g = 24g
Relative density of alcohol

$= \frac{24g}{30g}$

$= 0.8g$

2)

Density	Relative Density
• Density is the ratio between the mass and the volume of a body.	• Relative density is the ratio between the density of an object and density of water.
• Its units are gcm^{-3} and kgm^{-3}	• It has no units.

3) A piece of aluminium of any volume has mass 2.7 times that of an unequal volume of water.

4) Mass of the empty bottle = 21.8g
Mass of the bottle + water = 41.8g
Mass of the bottle + liquid = 40.6g
Mass of water = (41.8g - 21.8g) = 20.0g.
Mass of liquid = (41.8 - 40.6g) = 1.2g
Relative density of liquid.

$= \frac{1.2}{20}\ g$

$= 0.06\ g$

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65) Mass of empty density bottle = 22g

Mass of bottle + water = 50g

Mass of bottle + brine solution = 54g

Mass of water = (50g - 22g) = 28g

Mass of brine solution = (54 - 22g = 32g

Relative density of liquid

$\frac{32}{28}$

$\Rightarrow \frac{8}{7} = 1\frac{1}{7}$ g