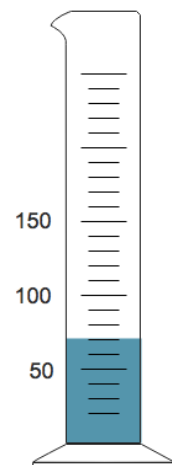


Density

- 1) A mug contains 200cm^3 of hot tea with a density of 1.01g/cm^3 . Bob adds 18g of sugar, which immediately dissolves. Assuming the addition of the sugar does not increase the volume of liquid in the mug, calculate the new density of the tea.
- 2) Aluminium has a density of 2.7g/cm^3 .
 - a) What is the mass of 20cm^3 of aluminium?
 - b) What is the volume of 54g of aluminium?
- 3) A piece of steel of mass 120g has a volume of 15cm^3 . Calculate its density.
- 4) Calculate the mass of air in a room with the dimensions of 10m x 5m x 3m, if the air has a density of 1.26kg/m^3 .
- 5) A stone of mass 60g is lowered into a measuring cylinder causing the liquid level to rise from 15cm^3 to 35cm^3 . Calculate the density of the stone in g/cm^3 .
- 6) The capacity of a petrol tank in a car is 0.08m^3 . Calculate the mass of petrol in a full tank if the density of petrol is 800kg/m^3 .
- 7) The mass of an evacuated steel container, of volume 1000cm^3 , is 350g. The mass of the steel container when full of air is 351.2g. Calculate the density of air.
- 8) 100 identical copper rivets are put into an empty measuring cylinder and 50cm^3 of water is poured over them. What is the volume of:
 - a) the 100 copper rivets
 - b) one copper rivet
 - c) if all the copper rivets together have a mass of 180g, calculate the density of copper.



Density

Answers

1) $\rho = 1.1 \text{ g/cm}^3$

2) a) $m = 54 \text{ g}$ b) $v = 20 \text{ cm}^3$

3) $\rho = 8 \text{ g/cm}^3$

4) $m = 189 \text{ g}$

5) $\rho = 3 \text{ g/cm}^3$

6) $m = 64 \text{ g}$

7) $\rho = 0.012 \text{ g/cm}^3$

8) a) $v = 20 \text{ cm}^3$ b) $v = 0.2 \text{ cm}^3$ c) $\rho = 9 \text{ g/cm}^3$

Density

- 1) mass of liquid = $v \times p = 200 \times 1.01 = 202\text{g}$
total mass of liquid = $202 + 18 = 220$
new density = $220 / 200 = 1.1 \text{ g/cm}^3$
- 2) a) volume = 20 cm^3 , mass = ?, density = 2.7 g/cm^3
mass = density x volume
= 2.7×20
= 54 g
- b) volume = ?, mass = 54 g , density = 2.7 g/cm^3
volume = $\frac{\text{mass}}{\text{density}} = \frac{54}{2.7} = 20 \text{ cm}^3$
- 3) volume = 15 cm^3 , mass = 120 g , density = ?
volume = $\frac{\text{mass}}{\text{density}} = \frac{120}{15} = 8 \text{ cm}^3$
- 4) volume = $10 \text{ m} \times 5 \text{ m} \times 3 \text{ m} = 150 \text{ m}^3$, mass = ?, density = 1.26 kg/m^3
mass = density x volume
= 1.26×150
= 189 g
- 5) volume = $(35 - 15) = 20 \text{ cm}^3$, mass = 60 g , density = ?
density = $\frac{\text{mass}}{\text{volume}} = \frac{60}{20} = 3 \text{ g/cm}^3$
- 6) volume = 0.8 m^3 , mass = ?, density = 800 kg/m^3
mass = density x volume
= 800×0.08
= 64 g
- 7) volume of air = 100 cm^3 , mass of air = $(351.2 - 350) = 1.2 \text{ g}$, density = ?
density = $\frac{\text{mass}}{\text{volume}} = \frac{1.2}{100} = 0.012 \text{ g/cm}^3$
- 8 a) volume of rivets = $70 - 50 = 20 \text{ cm}^3$
- b) volume of 1 rivet = $20/100 = 0.2 \text{ cm}^3$
volume of air = 20 cm^3 , mass of air = 180 g , density = ?
- c) density = $\frac{\text{mass}}{\text{volume}} = \frac{180}{20} = 9 \text{ g/cm}^3$