

1 Mass of density bottle when empty = 35g

Mass of bottle after being filled with water = 65g

∴ mass of water = 65 - 35 = 30g

Volume of water = 65 - 35 = 30 ml

Density of water = 1 g cm^{-3}

∴ mass of alcohol = 59g - 35g = 24g

Volume = 65 - 35 = 30 ml

Density = $\frac{24}{30} = 1.2 \text{ g cm}^{-3}$

Relative density

$$= \frac{1.2 \text{ g cm}^{-3}}{1 \text{ g cm}^{-3}}$$

$$= \frac{6}{5} = 1.2$$

2 A density bottle has a fixed volume; the extra amount of liquid comes out of the hole on the top, so it takes out volume.

3 Density has a unit and it is $\frac{\text{Mass}}{\text{Volume}}$, whereas relative density has no unit and is just a comparison between the density of the liquid and density of water.

4 Relative density of aluminium is 2.7 is that the comparison of its density is equal to to the density of water is 2.7

5

$$a) 41.8g - 21.8g = 20g \text{ ml}$$

$$b) \frac{\text{mass of liquid}}{\text{volume of liquid}} = \frac{40.6g}{20 \text{ ml}} = 812 \text{ g/cm}^3$$

$$\text{So relative density} = \frac{812 \text{ g/cm}^3}{1 \text{ g/cm}^3} = 812$$

6

$$i) \text{ Density of brine solution} = \frac{54.22}{50.22} = \frac{32g}{25 \text{ ml}} = \frac{32}{25} = 1.1 \text{ g/cm}^3$$

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