Conversion Factor Introduction

1. Find the mass (in g) of 34.5 kg of H_2O

34.5 kg H_2O x $\frac{1000\ g\ H_2O}{1\ kg\ H_2O}$ = 34500 g H_2O

1000 g H_2O = 1 kg H_2O

2. Find the volume (in L) of 284 mL of water

284 mL H_2O x $\frac{1\ L\ H_2O}{1000\ mL\ H_2O}$ = 0.284 L H_2O

1 L H_2O = 1000 mL H_2O

3. Find the mass (in g) of 0.00500 mol of gold

0.00500 mol Au x $\frac{196.97\ g\ Au}{1\ mol\ Au}$ = 0.985 g Au

196.97 g Au = 1 mol Au

4. Find the amount (in mol) of 35.9 g of scandium

35.9 g Sc x $\frac{1\ mol\ Sc}{44.96\ g\ Sc}$ = 0.798 mol Sc

1 mol Sc = 44.96 g Sc

5. Find the number of atoms in 0.00500 mol of gold

0.00500 mol Au x $\frac{6.022 \times 10^{23}\ atoms\ Au}{1\ mol\ Au}$ = 3.01×10^{21} atoms Au

6.022×10^{23} atoms Au = 1 mol Au

6. Find the amount (in mol) of 4.5×10^{22} molec of water

4.52×10^{22} molec H_2O x $\frac{1\ mol\ H_2O}{6.022 \times 10^{23}\ molec\ H_2O}$ = 0.0751 mol H_2O

1 mol H_2O = 6.022×10^{23} molec H_2O

7. Find the mass (in g) of 0.422 mol of glucose

0.422 mol $C_6H_{12}O_6$ x $\frac{180.18\ g\ C_6H_{12}O_6}{1\ mol\ C_6H_{12}O_6}$ = 76.0 g $C_6H_{12}O_6$

180.18 g $C_6H_{12}O_6$ = 1 mol $C_6H_{12}O_6$

8. Find the amount (in mol) of 25.4 g of H_2SO_4

$25.4\ g\ H_2SO_4 \times \frac{1\ mol\ H_2SO_4}{98.09\ g\ H_2SO_4} = 0.259\ mol\ H_2SO_4$

$1\ mol\ H_2SO_4 = 98.09\ g\ H_2SO_4$

9. Find the number of molecules in 300 g of O_2

$300\ g\ O_2 \times \frac{1\ mol\ O_2}{32.00\ g\ O_2} \times \frac{6.022 \times 10^{23}\ molec\ O_2}{1\ mol\ O_2} = 5.65 \times 10^{24}\ molec\ O_2$

$1\ mol\ O_2 = 32.00\ g\ O_2$ / $6.022 \times 10^{23}\ molec\ O_2 = 1\ mol\ O_2$

10. Find the amount (in mol) of 250 mL of water (1 mL of water has a mass of 1 g)

$250\ mL\ H_2O \times \frac{1\ g\ H_2O}{1\ mL\ H_2O} \times \frac{1\ mol\ H_2O}{18.02\ g\ H_2O} = 13.9\ mol\ H_2O$

$1\ g\ H_2O = 1\ mL\ H_2O$ / $1\ mol\ H_2O = 18.02\ g\ H_2O$

11. Find the mass (in g) of 1×10^{24} molec of CO_2

$1.00 \times 10^{24}\ molec\ CO_2 \times \frac{1\ mol\ CO_2}{6.022 \times 10^{23}\ molec\ CO_2} \times \frac{44.01\ g\ CO_2}{1\ mol\ CO_2} = 73.1\ g\ CO_2$

$1\ mol\ CO_2 = 6.022 \times 10^{23}\ molec\ CO_2$ / $44.01\ g\ CO_2 = 1\ mol\ CO_2$

12. Find the number of molecules in 3.00 g of CH_2O

$3.00\ g\ CH_2O \times \frac{1\ mol\ CH_2O}{30.03\ g\ CH_2O} \times \frac{6.022 \times 10^{23}\ molec\ CH_2O}{1\ mol\ CH_2O} = 6.02\ molec\ CH_2O$

$1\ mol\ CH_2O = 30.03\ g\ CH_2O$ / $6.022 \times 10^{23}\ molec\ CH_2O = 1\ mol\ CH_2O$

13. Find the mass (in g) of 1.27×10^{23} atoms of Cu

$1.27 \times 10^{23}\ atoms\ Cu \times \frac{1\ mol\ Cu}{6.022 \times 10^{23}\ atoms\ Cu} \times \frac{63.55\ g\ Cu}{1\ mol\ Cu} = 13.4\ g\ Cu$

14. Find the number of oxygen molecules that could be extracted by electroylsis from 45 mL of pure water

$45\ mL\ H_2O \times \frac{1\ g\ H_2O}{1\ mL\ H_2O} \times \frac{1\ mol\ H_2O}{18.02\ g\ H_2O} \times \frac{6.022 \times 10^{23}\ molec\ H_2O}{1\ mol\ H_2O}$

$\times \frac{1\ atom\ O}{1\ molec\ H_2O} \times \frac{1\ molec\ O_2}{2\ atoms\ O} = 7.52 \times 10^{23}\ molec\ O_2$