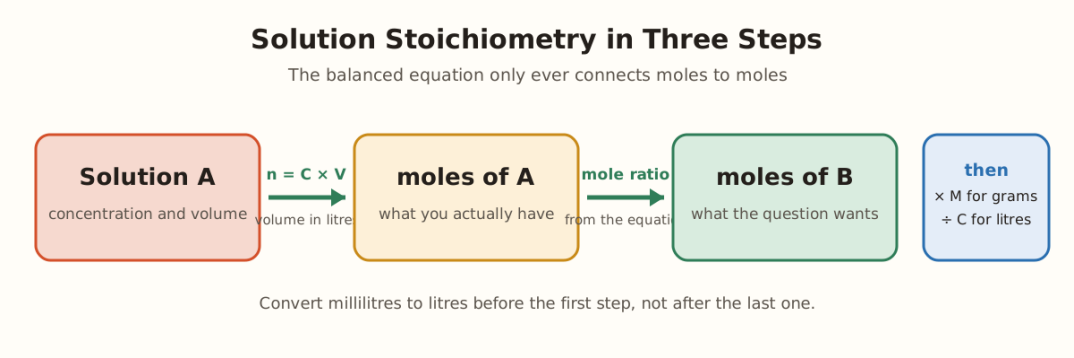
Solution Stoichiometry Worksheet

Grade 11 Chemistry · concentration, volume and the mole ratio

Name: _____ Date: _____ Score: / 16



Before you start: every equation below is already balanced. Convert millilitres to litres before the first step. Round each displayed intermediate to three significant figures and carry that rounded value forward, so your working matches the key.

Part A · the route in words

1. To get moles from a solution you multiply its concentration by its _____, in _____.
2. The balanced equation converts moles of one substance into moles of another. It can never convert _____ directly into _____.

Part B · moles of product

#	Equation	Given	Answer
1	$2HCl + Na_2CO_3 \rightarrow 2NaCl + H_2O + CO_2$	0.250 mol/L, 40.0 mL HCl	
2	$H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$	0.500 mol/L, 25.0 mL NaOH	
3	$3AgNO_3 + AlCl_3 \rightarrow 3AgCl + Al(NO_3)_3$	0.100 mol/L, 60.0 mL $AgNO_3$	
4	$2KI + Pb(NO_3)_2 \rightarrow PbI_2 + 2KNO_3$	0.200 mol/L, 50.0 mL KI	

Part C · mass of precipitate

#	Equation	Given	Answer
5	$BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$	0.150 mol/L, 80.0 mL Na_2SO_4	
6	$3AgNO_3 + AlCl_3 \rightarrow 3AgCl + Al(NO_3)_3$	0.250 mol/L, 40.0 mL $AgNO_3$	
7	$2KI + Pb(NO_3)_2 \rightarrow PbI_2 + 2KNO_3$	0.100 mol/L, 75.0 mL $Pb(NO_3)_2$	
8	$CaCl_2 + Na_2CO_3 \rightarrow CaCO_3 + 2NaCl$	0.300 mol/L, 50.0 mL $CaCl_2$	

Part D · what volume of the second solution?

#	Equation	Given	Answer
9	$H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$	0.200 mol/L, 25.0 mL H_2SO_4, 0.500 mol/L NaOH	
10	$2HCl + Ca(OH)_2 \rightarrow CaCl_2 + 2H_2O$	0.400 mol/L, 50.0 mL HCl, 0.250 mol/L $Ca(OH)_2$	
11	$3HCl + Al(OH)_3 \rightarrow AlCl_3 + 3H_2O$	0.300 mol/L, 60.0 mL HCl, 0.100 mol/L $Al(OH)_3$	
12	$2AgNO_3 + K_2CrO_4 \rightarrow Ag_2CrO_4 + 2KNO_3$	0.150 mol/L, 40.0 mL $AgNO_3$, 0.200 mol/L K_2CrO_4	

Part E · find the unknown concentration

#	Equation	Given	Answer
13	$2HCl + Na_2CO_3 \rightarrow 2NaCl + H_2O + CO_2$	0.125 mol/L, 30.0 mL Na_2CO_3, 25.0 mL of HCl	
14	$H_2SO_4 + 2KOH \rightarrow K_2SO_4 + 2H_2O$	0.100 mol/L, 20.0 mL H_2SO_4, 40.0 mL of KOH	

Answer Key

Solution Stoichiometry · Grade 11 Chemistry

Part A

1. **volume**; **litres**
2. **grams** into **grams** — it only ever relates moles to moles

Parts B to E

#	Working	Answer
1	$n(HCl) = 0.250 \times 0.0400\ L = 0.0100\ mol \ \rightarrow \ \times$ ratio 1/2	**0.00500 mol CO_2**
2	$n(NaOH) = 0.500 \times 0.0250\ L = 0.0125\ mol \ \rightarrow \ \times$ ratio 1/2	**0.00625 mol Na_2SO_4**
3	$n(AgNO_3) = 0.100 \times 0.0600\ L = 0.00600\ mol \ \rightarrow \ \times$ ratio 3/3	**0.00600 mol AgCl**
4	$n(KI) = 0.200 \times 0.0500\ L = 0.0100\ mol \ \rightarrow \ \times$ ratio 1/2	**0.00500 mol PbI_2**
5	$n(Na_2SO_4) = 0.0120\ mol \rightarrow n(BaSO_4) = 0.0120\ mol \rightarrow \times 233.40$ g/mol	**2.80 g $BaSO_4$**
6	$n(AgNO_3) = 0.0100\ mol \rightarrow n(AgCl) = 0.0100\ mol \rightarrow \times 143.32$ g/mol	**1.43 g AgCl**
7	$n(Pb(NO_3)_2) = 0.00750\ mol \rightarrow n(PbI_2) = 0.00750\ mol \rightarrow \times 461.00$ g/mol	**3.46 g PbI_2**
8	$n(CaCl_2) = 0.0150\ mol \rightarrow n(CaCO_3) = 0.0150\ mol \rightarrow \times 100.09$ g/mol	**1.50 g $CaCO_3$**
9	$n(H_2SO_4) = 0.00500\ mol \rightarrow n(NaOH) = 0.0100\ mol \rightarrow \div 0.500$ mol/L	**20.0 mL**
10	$n(HCl) = 0.0200\ mol \rightarrow n(Ca(OH)_2) = 0.0100\ mol \rightarrow \div 0.250$ mol/L	**40.0 mL**
11	$n(HCl) = 0.0180\ mol \rightarrow n(Al(OH)_3) = 0.00600\ mol \rightarrow \div 0.100$ mol/L	**60.0 mL**
12	$n(AgNO_3) = 0.00600\ mol \rightarrow n(K_2CrO_4) = 0.00300\ mol \rightarrow \div 0.200$ mol/L	**15.0 mL**
13	$n(Na_2CO_3) = 0.00375\ mol \rightarrow n(HCl) = 0.00750\ mol \rightarrow \div 0.0250$ L	**0.300 mol/L**
14	$n(H_2SO_4) = 0.00200\ mol \rightarrow n(KOH) = 0.00400\ mol \rightarrow \div 0.0400$ L	**0.100 mol/L**