



A Level Chemistry

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Summer Work

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*Please complete the activities
in this booklet and hand in
during your first Chemistry
lesson in September*



SIR WILLIAM ROBERTSON
ACADEMY

iii Engage in wider reading



University of Cambridge Chemistry Department youtube page



University of Oxford Chemistry Department youtube page



A Day in the life of an undergraduate chemistry student



TED Talks on Chemistry



Variety of articles on recent uses of chemistry



Ionic Formulae

① Polyatomic Ions



Watch



<https://www.youtube.com/watch?v=gTvwmlH7zLk>



Create

Create a flashcard for each polyatomic ion in the table below including name, formula and charge. Make sure you review these regularly

Common Polyatomic Ions			
Ion	Name	Ion	Name
NH_4^+	Ammonium	CO_3^{2-}	Carbonate
NO_2^-	Nitrite	HCO_3^-	Hydrogen carbonate or Bicarbonate
NO_3^-	Nitrate	ClO^-	Hypochlorite
SO_3^{2-}	Sulfite	ClO_2^-	Chlorite
SO_4^{2-}	Sulfate	ClO_3^-	Chlorate
HSO_4^-	Hydrogen sulfate or Bisulfate	ClO_4^-	Perchlorate
OH^-	Hydroxide	$\text{C}_2\text{H}_3\text{O}_2^-$	Acetate
CN^-	Cyanide	MnO_4^-	Permanganate
PO_4^{3-}	Phosphate	$\text{Cr}_2\text{O}_7^{2-}$	Dichromate
HPO_4^{2-}	Hydrogen phosphate	CrO_4^{2-}	Chromate
$\text{H}_2\text{PO}_4^{2-}$	Dihydrogen phosphate	O_2^{2-}	Peroxide

② Determining Ionic Formulae



Watch



https://youtu.be/ct_7qhxh6JE



<https://www.youtube.com/watch?v=iQEGrX5Ud6g>



Practice

- | | | | | | | | |
|---|----|-----------------------|-------|---|----|----------------------|-------|
| 1 | a) | sodium iodide | ..... | 2 | a) | sodium sulfate | ..... |
| | b) | potassium oxide | ..... |  | b) | calcium sulfate | ..... |
| | c) | aluminium chloride | ..... |  | c) | magnesium hydroxide | ..... |
| | d) | magnesium bromide | ..... |  | d) | zinc(II) nitrate | ..... |
| | e) | aluminium oxide | ..... |  | e) | copper(II) carbonate | ..... |
| | f) | iron(II) oxide | ..... |  | f) | sodium hydroxide | ..... |
| | g) | iron(III) oxide | ..... |  | g) | potassium carbonate | ..... |
| | h) | magnesium sulfide | ..... |  | h) | iron(III) hydroxide | ..... |
| | i) | copper(II) fluoride | ..... |  | i) | ammonium nitrate | ..... |
| | j) | lithium iodide | ..... |  | j) | ammonium hydroxide | ..... |
| | k) | barium bromide | ..... |  | k) | iron(III) sulfate | ..... |
| | l) | zinc(II) sulfide | ..... |  | l) | aluminium nitrate | ..... |
| | m) | lead(II) iodide | ..... |  | m) | silver(I) nitrate | ..... |
| | n) | iron(III) sulfide | ..... |  | n) | calcium carbonate | ..... |
| | o) | magnesium oxide | ..... |  | o) | magnesium nitrate | ..... |
| | p) | rubidium bromide | ..... |  | p) | ammonium astatide | ..... |
| | q) | strontium chloride | ..... |  | q) | caesium nitrate | ..... |
| | r) | caesium selenide | ..... |  | r) | strontium hydroxide | ..... |
| | s) | calcium astatide | ..... |  | s) | platinum(II) nitrate | ..... |
| | t) | radium polonide | ..... |  | t) | cobalt(II) carbonate | ..... |
| | u) | gallium fluoride | ..... |  | u) | copper(I) oxide | ..... |
| | v) | scandium(III) bromide | ..... |  | v) | copper(II) oxide | ..... |
| | w) | chromium(III) oxide | ..... |  | w) | francium telluride | ..... |
| | x) | strontium iodide | ..... |  | x) | gold(I) fluoride | ..... |
| | y) | lithium arsenide | ..... |  | y) | rubidium sulfate | ..... |



Review

Turn to the back of the booklet and mark your answers on the previous page

Score: / 50



Check

Log on to the Quizlet below and attempt the questions



<https://quizlet.com/207566438/ionic-formula-flash-cards/>

Score: / 56

Balancing Equations



Watch



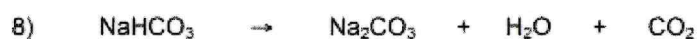
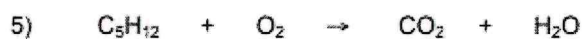
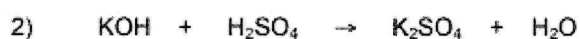
<https://www.youtube.com/watch?v=iy6F0Lbvjm8>



<https://www.youtube.com/watch?v=qquOFYOpdl0>



Practice





Review

Turn to the back of the booklet and mark your answers on the previous page

Score: / 9



Check

Log on to the quiz below and attempt the questions



<https://www.educationquizzes.com/gcse/chemistry/balancing-symbol-equations-h/>

Score: / 10

① Calculating Formula Mass



Watch



https://www.youtube.com/watch?v=it_fmQu5ivg



Practice

- 1 F_2
- 2 Fe
- 3 H_2SO_4
- 4 Al_2O_3
- 5 $\text{Mg}(\text{OH})_2$
- 6 $\text{Al}(\text{NO}_3)_3$
- 7 $(\text{NH}_4)_2\text{SO}_4$
- 8 CuCO_3
- 9 AgNO_3
- 10 NH_4NO_3



Review

Turn to the back of the booklet and mark your answers

Score: / 10

2 Mole Calculations



Watch



<https://www.youtube.com/watch?v=wPGVQu3UXpw>



Practice

1) Calculate the number of moles of each of the following substances. Give your answers to 3 sig figs.

a) 90.0 g of H_2O

.....

b) 20.0 g of C_4H_{10}

.....

c) 685 g of NH_3

.....

d) 102 tons of O_2

.....

e) 2.00 kg of Al_2O_3

.....

f) 20.6 mg of Au

.....

2) Calculate the mass of each of the following substances. Give your answers to 3 sig figs.

a) 4.00 moles of N_2

.....

b) 0.100 moles of HNO_3

.....

c) 0.0200 moles of K_2O

.....

d) 2.50 moles of PH_3

.....

e) 0.400 moles of $\text{C}_2\text{H}_5\text{OH}$

.....

f) 10.0 moles of $\text{Ca}(\text{OH})_2$

.....



Review

Turn to the back of the booklet and mark your answers

Score: / 12

Answers

① Ionic Formulae (*page 9*)

1 a) NaI

b) K₂O

c) AlCl₃

d) MgBr₂

e) Al₂O₃

f) FeO

g) Fe₂O₃

h) MgS

i) CuF₂

j) LiI

k) BaBr₂

l) ZnS

m) PbI₂

n) Fe₂S₃

o) MgO

p) RbBr

q) SrCl₂

r) CsSe

s) CaAt₂

t) RaPo

u) GaF₃

v) ScBr₃

w) Cr₂O₃

x) Srl₂

y) Li₃As

2 a) Na₂SO₄

b) CaSO₄

c) Mg(OH)₂

d) Zn(NO₃)₂

e) CuCO₃

f) NaOH

g) K₂CO₃

h) Fe(OH)₃

i) NH₄NO₃

j) NH₄OH

k) Fe₂(SO₄)₃

l) Al(NO₃)₃

m) AgNO₃

n) CaCO₃

o) Mg(NO₃)₂

p) NH₄At

q) CsNO₃

r) Sr(OH)₂

s) Pt(NO₃)₂

t) CoCO₃

u) Cu₂O

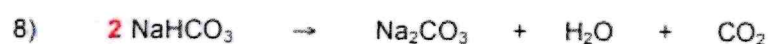
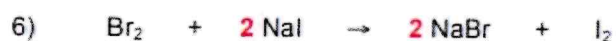
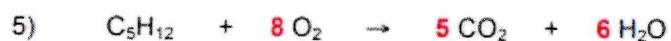
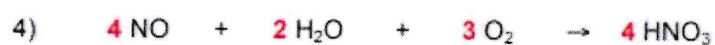
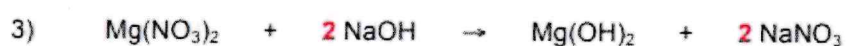
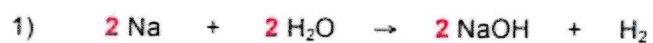
v) CuO

w) Fr₂Te

x) AuF

y) Rb₂SO₄

② Balancing Equations (*page 11*)



3 Formula Mass Calculations (*page 14*)

1	F ₂	2(19)	= 38
2	Fe		= 56
3	H ₂ SO ₄	2(1) + 32 + 4(16)	= 98
4	Al ₂ O ₃	2(27) + 3(16)	= 102
5	Mg(OH) ₂	24 + 2(16) + 2(1)	= 58
6	Al(NO ₃) ₃	27 + 3(14) + 9(16)	= 213
7	(NH ₄) ₂ SO ₄	2(14) + 8(1) + 32 + 4(16)	= 132
8	CuCO ₃	63.5 + 12 + 3(16)	= 123.5
9	AgNO ₃	108 + 14 + 3(16)	= 170
10	NH ₄ NO ₃	14 + 4(1) + 14 + 3(16)	= 80

4 Mole Calculations (*page 15*)

1) Calculate the number of moles of each of the following substances. Give your answers to 3 significant figures.

- a) 90.0 g of H₂O $\frac{90.0}{18} = 5.00$
- b) 20.0 g of C₄H₁₀ $\frac{20.0}{58} = 0.345$
- c) 685 g of NH₃ $\frac{685}{17} = 40.3$
- d) 102 tons of O₂ $\frac{102000000}{32} = 3190000 \text{ (} 3.19 \times 10^6 \text{)}$
- e) 2.00 kg of Al₂O₃ $\frac{2000}{102} = 19.6$
- f) 20.6 mg of Au $\frac{0.0206}{197} = 0.000105 \text{ (} 1.05 \times 10^{-4} \text{)}$

2) Calculate the mass of each of the following substances. Give your answers to 3 significant figures.

- a) 4.00 moles of N₂ $4.00 \times 28 = 112 \text{ g}$
- b) 0.100 moles of HNO₃ $0.100 \times 63 = 6.30 \text{ g}$
- c) 0.0200 moles of K₂O $0.0200 \times 94 = 1.88 \text{ g}$
- d) 2.50 moles of PH₃ $2.50 \times 34 = 85.0 \text{ g}$
- e) 0.400 moles of C₂H₅OH $0.400 \times 46 = 18.4 \text{ g}$
- f) 10.0 moles of Ca(OH)₂ $10.0 \times 74 = 740 \text{ g}$