

Home Gameboard

Chemistry

Foundations

Stoichiometry

Essential Pre-Uni Chemistry A1.1

## **Essential Pre-Uni Chemistry A1.1**



Find the empirical formulae for the ten compounds in Parts A - J, from the data given below. No compound contains more than 15 atoms in total in its formula. All compositions are by mass.

Element	Atomic Mass	Element	Atomic Mass
Hydrogen	1.0	Chlorine	35.5
Carbon	12.0	Potassium	39.1
Nitrogen	14.0	Vanadium	50.9
Oxygen	16.0	Chromium	52.0
Sulfur	32.1	Lead	207.2

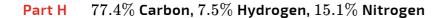
Part A 35.0% Nitrogen, 5.0% Hydrogen, 60.0% Oxygen

35.0% Nitrogen, 5.0% Hydrogen, 60.0% Oxygen

Part B 90.7% Lead, 9.3% Oxygen

90.7% Lead, 9.3% Oxygen

Part C $26.6\%$ Potassium, $35.3\%$ Chromium, $38.1\%$ Oxygen
26.6% Potassium, $35.3%$ Chromium, $38.1%$ Oxygen
Part D $40.3\%$ Potassium, $26.8\%$ Chromium, $32.9\%$ Oxygen
40.3% Potassium, $26.8%$ Chromium, $32.9%$ Oxygen
Part E $29.4\%$ Vanadium, $9.2\%$ Oxygen, $61.4\%$ Chlorine
29.4% Vanadium, $9.2%$ Oxygen, $61.4%$ Chlorine
Part F $81.8\%$ Carbon, $18.2\%$ Hydrogen
81.8% Carbon, $18.2%$ Hydrogen
Part G $38.7\%$ Carbon, $9.7\%$ Hydrogen, $51.6\%$ Oxygen
38.7% Carbon, $9.7%$ Hydrogen, $51.6%$ Oxygen



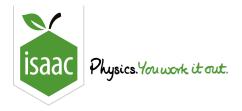
77.4% Carbon, 7.5% Hydrogen, 15.1% Nitrogen

### Part I 25.9% Nitrogen, 74.1% Oxygen

25.9% Nitrogen, 74.1% Oxygen

### Part J 29.7% Carbon, 5.8% Hydrogen, 26.5% Sulfur, 11.6% Nitrogen, 26.4% Oxygen

29.7% Carbon, 5.8% Hydrogen, 26.5% Sulfur, 11.6% Nitrogen, 26.4% Oxygen. In your answer, place the elements in the order just given.



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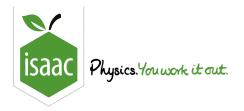
Stoichiometry Essential Pre-Uni Chemistry A1.2

## Essential Pre-Uni Chemistry A1.2



Complete combustion of  $6.4\,\mathrm{g}$  of compound K produced  $8.8\,\mathrm{g}$  of carbon dioxide and  $7.2\,\mathrm{g}$  of water.

Calculate the empirical formula of K.



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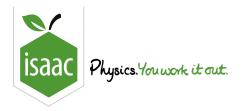
Stoichiometry Essential Pre-Uni Chemistry A1.3

## Essential Pre-Uni Chemistry A1.3



Complete combustion of  $1.80\,\mathrm{g}$  of compound L produced  $2.64\,\mathrm{g}$  of carbon dioxide,  $1.08\,\mathrm{g}$  of water and  $1.92\,\mathrm{g}$ of sulfur dioxide.

Calculate the empirical formula of L.



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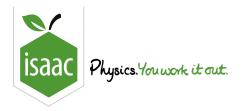
## Essential Pre-Uni Chemistry A2.6



Assume that the mass of an isotope in amu to 3 significant figures is equal to its mass number.

The relative molecular mass of compound M is  $135\,\mathrm{amu}$ . M contains 3.7% hydrogen, 44.4% carbon and 51.9% nitrogen by mass.

Find the molecular formula of M.



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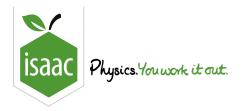
## Essential Pre-Uni Chemistry A2.7



Assume that the mass of an isotope in amu to 3 significant figures is equal to its mass number.

Complete combustion of compound N occurs in a stoichiometric ratio of 1:6 with oxygen gas. Complete combustion of  $4.2\,\mathrm{g}$  of compound N produces  $13.2\,\mathrm{g}$  of carbon dioxide and  $5.4\,\mathrm{g}$  of water.

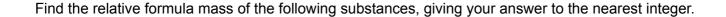
Find the molecular formula of N.



Home Gameboard Chemistry Foundations Stoichiometry Relative formula mass

## Relative formula mass





Part A  $Na_2Cr_2O_7$ 

What is the relative formula mass of  $Na_2Cr_2O_7$ ?

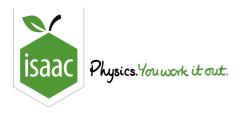
 $\begin{array}{ll} \textbf{Part B} & Na_2Cr_2O_7 \cdot 2\,H_2O \end{array}$ 

What is the relative formula mass of  $Na_{2}Cr_{2}O_{7}\cdot2\,H_{2}O?$ 

#### Part C Nitric acid

What is the relative formula mass of nitric acid?

Part D Propanol
What is the relative formula mass of propanol?
Part E Sodium carbonate
What is the relative formula mass of sodium carbonate?
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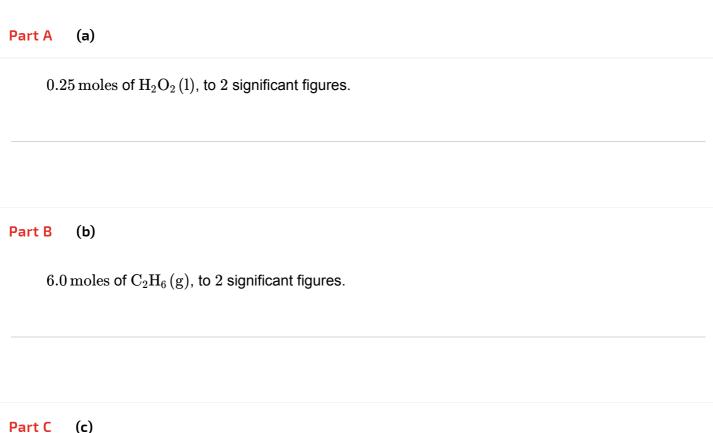
Stoichiometry

Essential Pre-Uni Chemistry B4.2

## Essential Pre-Uni Chemistry B4.2



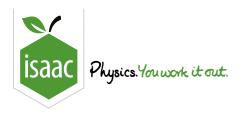
Calculate the mass of the following compounds. Give your answers to the appropriate number of significant figures.



### (c)

 $0.40\,\mathrm{moles}$  of  $\mathrm{H_2O}\left(l\right)$ , to 2 significant figures





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Stoichiometry Essential Pre-Uni Chemistry B5.1

# Essential Pre-Uni Chemistry B5.1



Calculate the concentration in $\mathrm{mol}\mathrm{dm}^{-3}$ of the following solutions:		
Part A (a)		
$0.40\mathrm{g\ NaOH}$ in $100\mathrm{ml}$ water		
Part B (b)		
$7.3\mathrm{g\ HCl}$ in $1000\mathrm{ml}$ water		
Part C (c)		
$2.5\mathrm{g}\;\mathrm{H_2SO_4}$ in $50\mathrm{ml}$ water		



 $15\,\mathrm{g}~FeSO_4$  in  $500\,\mathrm{ml}$  water, to 2 significant figures

### Part E (e)

 $0.16\,\mathrm{g}\; KMnO_4$  in  $200\,\mathrm{ml}$