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## 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

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### Part B 90.7% Lead, 9.3% Oxygen

90.7% Lead, 9.3% Oxygen

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**Part C**    26.6% Potassium, 35.3% Chromium, 38.1% Oxygen

26.6% Potassium, 35.3% Chromium, 38.1% Oxygen

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**Part D**    40.3% Potassium, 26.8% Chromium, 32.9% Oxygen

40.3% Potassium, 26.8% Chromium, 32.9% Oxygen

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**Part E**    29.4% Vanadium, 9.2% Oxygen, 61.4% Chlorine

29.4% Vanadium, 9.2% Oxygen, 61.4% Chlorine

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**Part F**    81.8% Carbon, 18.2% Hydrogen

81.8% Carbon, 18.2% Hydrogen

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**Part G**    38.7% Carbon, 9.7% Hydrogen, 51.6% Oxygen

38.7% Carbon, 9.7% Hydrogen, 51.6% Oxygen

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**Part H** 77.4% Carbon, 7.5% Hydrogen, 15.1% Nitrogen

77.4% Carbon, 7.5% Hydrogen, 15.1% Nitrogen

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

25.9% Nitrogen, 74.1% Oxygen

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**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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## Essential Pre-Uni Chemistry A1.2

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Complete combustion of 6.4 g of compound K produced 8.8 g of carbon dioxide and 7.2 g of water.

Calculate the empirical formula of K.

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## Essential Pre-Uni Chemistry A1.3



Complete combustion of 1.80 g of compound L produced 2.64 g of carbon dioxide, 1.08 g of water and 1.92 g of sulfur dioxide.

Calculate the empirical formula of L.

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## Essential Pre-Uni Chemistry A2.6

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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 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  $\text{amu}$  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 g of compound N produces 13.2 g of carbon dioxide and 5.4 g of water.

Find the molecular formula of N.

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## Relative formula mass

A Level  


Find the relative formula mass of the following substances, giving your answer to the nearest integer.

**Part A**  $\text{Na}_2\text{Cr}_2\text{O}_7$

What is the relative formula mass of  $\text{Na}_2\text{Cr}_2\text{O}_7$ ?

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**Part B**  $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$

What is the relative formula mass of  $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$ ?

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**Part C** Nitric acid

What is the relative formula mass of nitric acid?

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**Part D**    **Propanol**

What is the relative formula mass of propanol?

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**Part E**    **Sodium carbonate**

What is the relative formula mass of sodium carbonate?

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## Essential Pre-Uni Chemistry B4.2



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

### Part A (a)

0.25 moles of  $\text{H}_2\text{O}_2$  (l), to 2 significant figures.

### Part B (b)

6.0 moles of  $\text{C}_2\text{H}_6$  (g), to 2 significant figures.

### Part C (c)

0.40 moles of  $\text{H}_2\text{O}$  (l), to 2 significant figures

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**Part D** (d)

20.0 moles of Sr (s), to 3 significant figures.

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**Part E** (e)

1.20 moles of aluminium oxide, to 3 significant figures.

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**Part F** (f)

7.4 moles of ammonium sulfate, to 2 significant figures.

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## Essential Pre-Uni Chemistry B5.1



Calculate the concentration in  $\text{mol dm}^{-3}$  of the following solutions:

### Part A (a)

0.40 g NaOH in 100 ml water

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### Part B (b)

7.3 g HCl in 1000 ml water

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### Part C (c)

2.5 g  $\text{H}_2\text{SO}_4$  in 50 ml water

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**Part D (d)**

15 g  $\text{FeSO}_4$  in 500 ml water, to 2 significant figures

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**Part E (e)**

0.16 g  $\text{KMnO}_4$  in 200 ml

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