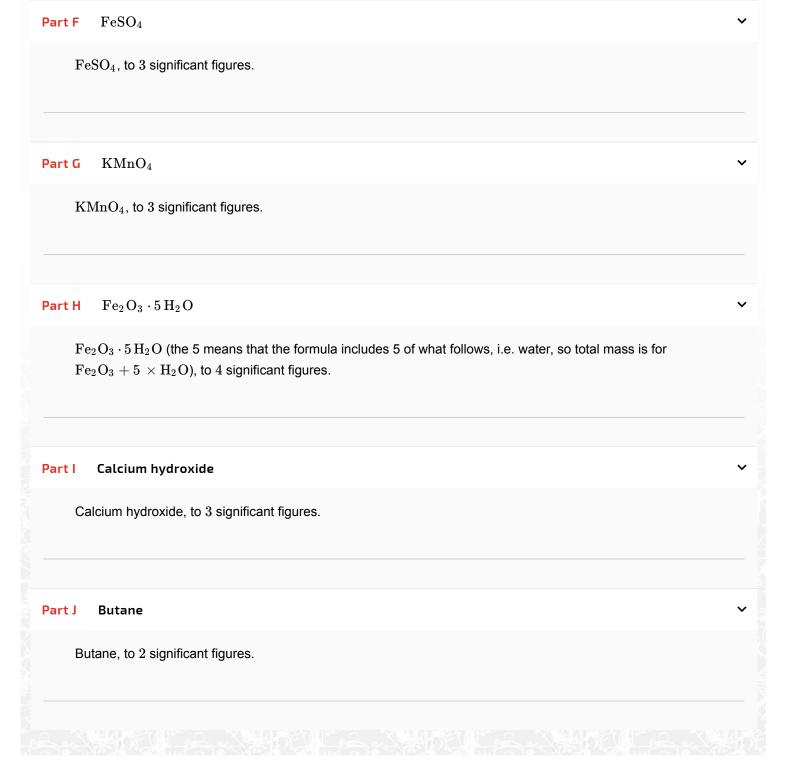


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# Essential Pre-Uni Chemistry B4.1



Find the molar masses in amu of the following compounds.	
Part A CaCO <sub>3</sub>	^
${ m CaCO_3}$ , to $4$ significant figures.	
Part B Na <sub>2</sub> CO <sub>3</sub>	~
${ m Na_2CO_3}$ , to $3$ significant figures.	
Part C NaOH	~
NaOH, to 2 significant figures.	
Part D HCl	~
HCl, to 3 significant figures.	
Part E H <sub>2</sub> SO <sub>4</sub>	<b>~</b>
$ m H_2SO_4$ , to $3$ significant figures.	





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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)  $0.25\,\mathrm{moles}$  of  $H_2\,O_2\,(l)$ , to 2 significant figures. Part B (b)  $6.0 \,\mathrm{moles}$  of  $\mathrm{C_2H_6}\left(\mathrm{g}\right)$ , to 2 significant figures. Part C (c)  $0.40\,\mathrm{moles}$  of  $H_2O\left(l\right)$ , to 2 significant figures Part D (d)  $20.0 \,\mathrm{moles}$  of  $\mathrm{Sr}\,(\mathrm{s})$ , to 3 significant figures. Part E (e)  $1.20\,\mathrm{moles}$  of aluminium oxide, to 3 significant figures.

Part F (f)

 $7.4\,\mathrm{moles}$  of ammonium sulfate, to 2 significant figures.



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## Essential Pre-Uni Chemistry B5.1



alculate the concentration in ${ m moldm^{-3}}$ 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	
Part D (d)	~
$15\mathrm{g\ FeSO_4}$ in $500\mathrm{ml}$ water, to 2 significant figures	
Part E (e)	~
$0.16\mathrm{g~KMnO_4}$ in $200\mathrm{ml}$	
$0.16\mathrm{g~KMnO_4}$ in $200\mathrm{ml}$	



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### Essential Pre-Uni Chemistry A2.6



Assume that the mass of an isotope in  $\mathbf{amu}$  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  $\mathbf{amu}$  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.



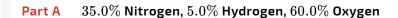
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#### Essential Pre-Uni Chemistry A1.1



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



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

29	1.4% Vanadium, $9.2%$ Oxygen, $61.4%$ Chlorine
art F	81.8% Carbon, $18.2%$ Hydrogen
81	18.2% Hydrogen
art G	38.7% Carbon, $9.7%$ Hydrogen, $51.6%$ Oxygen
38	.7% Carbon, $9.7%$ Hydrogen, $51.6%$ Oxygen
Part H	77.4% Carbon, $7.5%$ Hydrogen, $15.1%$ Nitrogen
77	1.4% Carbon, $1.5%$ 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
	.7% Carbon, $5.8%$ Hydrogen, $26.5%$ Sulfur, $11.6%$ Nitrogen, $26.4%$ Oxygen. In your answer, place the ements in the order just given.



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## 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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### 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.