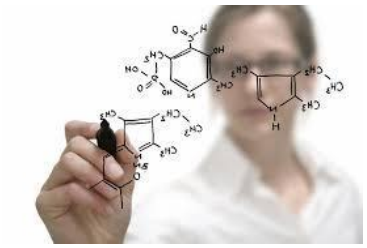
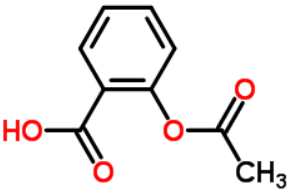
Summer Bridging Work GCSE to A Level CHEMISTRY

Well done – you have passed GCSE Science with a good grade.





WHAT IS THIS?

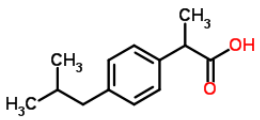
A Level Chemistry is the next step on YOUR exciting journey.

We are pleased that you have chosen Strode's College to continue with your chemistry studies.

In order to be as successful as possible you should complete the following questions.

Please make sure you bring this pack to your first chemistry lesson

NOTE: the questions like this, WHAT IS THIS? **are just for fun and will not be marked**

WHAT IS THI 

Your tutors **Alison Hawkins BSc MPhil**
and Noel MacCaoilte CChem MRSC CSci MPhil

ATOMIC STRUCTURE

WHAT DOES T $1s^2 2s^2 2p^6 3s^1$

Q 1 (a) complete the table below

particle	symbol	mass(amu)	charge
proton			
neutron			
electron			

3 marks

Q 1 (b) Complete the table below.

Species	number of protons	number of neutrons	number of electrons
^{16}O			
$^{16}O^{2-}$			
$^{56}Fe^{2+}$			
$^{55}Fe^{3+}$			
$^{27}Al^{3+}$			

5 marks – mark by row

Q 1 (c) Write the electronic configurations for the following species

Species	Electron configuration
O	
O^{2-}	
Mg	
Al^{3+}	
Fe	
Fe^{2+}	
Fe^{3+}	

7 to 6 correct: 4 marks;

5 to 4 correct: 3 marks

3 to 2 correct: 2 marks;

1 correct: 1 mark

Formulae and ions

You need to know the formulae and charges on all of the common ions on the course.

Q 2a – formulae and charges on ions - try this test.

Ion of	Formula for ion	ion of	Formula for ion
Na		iron in iron (II) oxide	
Ca		copper in copper (I) oxide	
Al		sulfate	
hydroxide		nitrate	
Cl		carbonate	
ammonium		Br	
nitride		iodide	
sulphide		oxide	

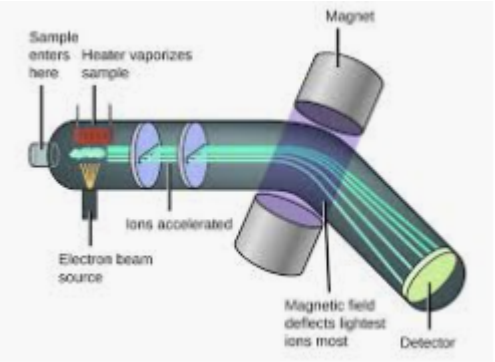
16 to 14 correct: 5 marks;

13 to 11 correct: 4 marks

10 to 8 correct: 3 marks;

7 to 5 correct: 2 marks

4 to 2 correct: 1 marks



Q 2b write the formulae for the species below.

Name	Formula	Name	Formula
calcium oxide		strontium sulfate	
magnesium hydroxide		lithium bromide	
sodium sulphide		rubidium nitrate	
aluminium iodide		aluminium sulfate	
aluminium hydroxide		magnesium sulfide	
magnesium nitride		potassium sulfate	
calcium carbonate		iron (III) nitrate	

14 to 13 correct: 6 marks; 12 to 11 correct: 5 marks

10 to 9 correct: 4 marks; 8 to 7 correct: 3 marks

6 to 5 correct: 2 marks 4 to 3 correct: 1 mark

Q 2c

Substance	Formula mass	Formula mass	Formula mass	Formula mass	Formula mass
H_2O		CO_2		C_2H_5OH	
C_2H_4		HBr		HNO_3	
NaCl		$NaNO_3$		Na_2CO_3	
$CaCl_2$		$Ca(OH)_2$		$Al(NO3)_3$	
$Fe_2(SO_4)_3$		$PbCl_2$		$CuSO_4.5H_2O$	
$FeSO_4.7H_2O$		$(NH_4)_2SO_4.Fe_2(SO_4)_3.24H_2O$			

17 to 15 correct: 7 marks; 14 to 12 correct: 6 marks 11 to 9 correct: 5 marks;

8 to 6 correct: 4 marks 5 to 3 correct: 3 marks 4 to 3 correct: 2 marks

2 correct: 1 mark

WHAT IS HAPPENING HERE?

BONDING

Q 3 a:

(a) What is meant by a covalent bond?

2 marks

(b) What is meant by a dative covalent bond?

2 marks

(c) Define ionic bond

2 marks

Q 3 b:

Draw a dot:cross diagram for the ammonia molecule

2 marks

Q 3 c: Draw a dot:cross diagram for calcium fluoride

2 marks

Q 3 d: Draw a dot:cross diagram for barium

2 marks

Q 4

Describe and explain how sodium chloride can sometimes conduct electricity and sometimes it cannot conduct electricity.

4 marks

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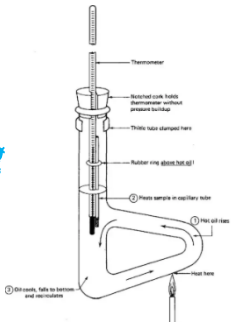


Q 4b

Explain how metals conduct electricity

2 marks

WHAT COULD BE IN THE FLASK? WHY? WHAT IS HAPPENING HERE?

MOLES AND MOLAR CALCULATIONS

Q 5 a What is a mole?

2 marks

Q 5 b Calculate the number of moles in the following

Note: 1 mol of any gas occupies 24dm^3 at 298K and 101kPa

i. 24 g C **1 mark**

ii. 28g ^{56}Fe **1 mark**

iii. 12dm^3 CO_2 **1 mark**

iv. 500 cm^3 of a 1 mol.dm^{-3} solution of H_2SO_4 **2 marks**

Q 5 c Here is the equation for the reaction of sodium hydroxide with hydrochloric acid:

$NaOH + HCl \rightarrow NaCl + H_2O$

4 g

Calculate the mass of HCl needed to react with the NaOH

Q 5 d Methane may be used as a fuel.

Calculate the volume of oxygen needed for the following reaction:

Calculate the volume of air needed for the same reaction:

$CH_4 + 2O_2 \rightarrow CO_2 + H_2O$

240 dm^3

4 marks

Q 5 e **Calculate the number of atoms in 2.3 g CH_3CH_2OH** **4 marks**

Q6 **The following equation is used to calculate pH for weak acids**

e.g. CH_3COOH.

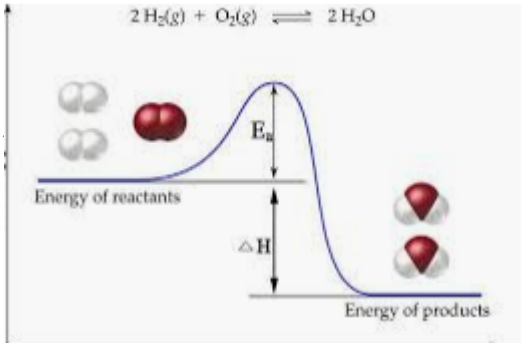
K_a = $[H^+]$. $[CH_3COO^-]$ / $[CH_3COOH]$

(a) Rearrange the equation to give a value for $[H^+]$

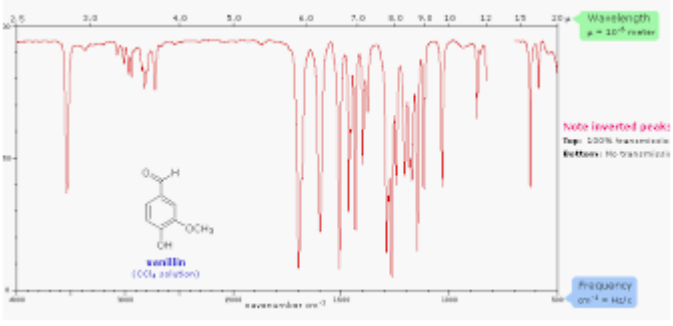
i.e. make $[H^+]$ the subject. **1 mark**

(b) Using K_a = $[H^+]$. $[CH_3COO^-]$ / $[CH_3COOH]$, if $[H^+]$ = $[CH_3COO^-]$,

Now give an expression for $[H^+]$ **2 marks**



IS THIS REACTION ENDOTHERMIC OR



WHICH TECHNIQUE IS BEING USED HERE?

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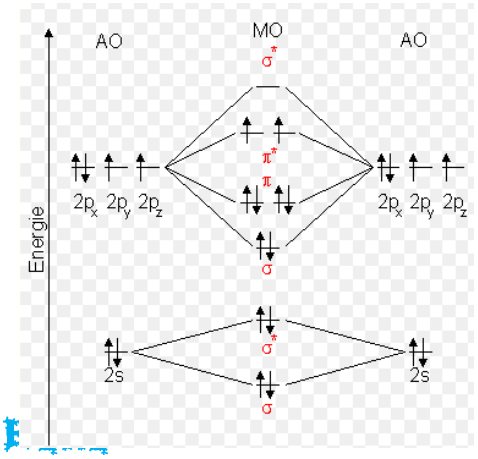

WHAT INFORMATION ARE WE GIVEN

END