Centre No.			Paper Reference (complete below)						Surname	Initial(s)		
Candidate No.							Н	/	1	H	Signature	

Paper Reference(s)

5018H/1H 5038H/1H Edexcel GCSE

Additional Science (5018H)

Chemistry (5038H)

C2 – Topics 5 to 8

Higher Tier

Wednesday 2 March 2011 – Morning

Time: 30 minutes

Materials required for examination
Calculator

Items included with question papers

Ni

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature, and complete the paper reference.

Check that you have the correct question paper.

Answer ALL the questions. Write your answers in the spaces provided in this question paper.

Do not use pencil. Use black ink.

Show all stages in any calculations and state the units. Calculators may be used.

Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). There are 4 questions in this question paper. The total mark for this paper is 30. There are 12 pages in this question paper. Any blank pages are indicated.

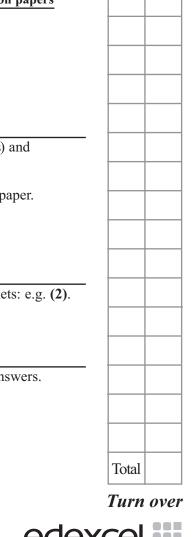
Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.

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Examiner's use only

Team Leader's use only

Question

1

2

3

4

Leave



W850/R1536/57570 1/1/1/1/

The Periodic Table of the Elements

0 He + 2 2 2	20 Ne neon 10	40 Ar argon 18	84 Kr krypton 36	131 Xe xenon 54	[222] Rn radon 86	fully
7	19 F fluorine 9	35.5 CI chlorine 17	80 Br bromine 35	127 	[210] At astatine 85	orted but not
9	16 O oxygen 8	32 S sulfur 16	79 Se selenium 34	128 Te tellunium 52	[209] Po polonium 84	ve been repo
5	14 N nitrogen 7	31 P phosphorus 15	75 As arsenic 33	Sb antimony 51	209 Bi bismuth 83	s 112-116 ha authenticated
4	12 C carbon 6	28 Si silicon 14	73 Ge gemanium 32	Sn # 50	207 Pb lead 82	mic numbers a
ဇ	11 B boron 5	27 AI aluminium 13	70 Ga gallium 31	115 In indium 49	204 T thailium 81	Elements with atomic numbers 112-116 have been reported but not fully authenticated
'			65 Zn zinc 30	112 Cd cadmium 48	201 Hg mercury 80	Elem
			63.5 Cu ©pper 29	108 Ag silver 47	197 Au gold 79	Rg roentgenium 111
			59 nickel 28	106 Pd palladium 46	195 Pt platinum 78	[271] Ds damstadtum 110
			59 Co cobalt 27	103 Rh rhodium 45	192 Fr iridium 777	[268] Mt meitnerium 109
hydrogen			56 Fe iron 26	Ru ruthenium 44	190 Os osmium 76	[277] Hs hassium 108
			55 Mn manganese 25	[98] Tc technetium 43	186 Re rhenium 75	[264] Bh bohrium 107
	nass ool umber		52 Cr chromium 24	96 Mo molybdenum 42	184 W tungsten 74	[266] Sg seaborgium 106
Key	relative atomic mass atomic symbol name atomic (proton) number		51 V vanadium 23	93 Nb niobium 41	181 Ta tantalum 73	[262] Db dubnium 105
	relativ ato atomic		48 T: ttanium 22	91 Zr zirconium 40	178 Hf hafnium 72	[261] Rf nutherfordium 104
'			45 Sc scandium 21	89 ×	139 La* lanthanum 57	[227] Ac* actinium 89
2	9 Be beryllium 4	24 Mg magnesium 12	40 Ca calcium 20	88 Sr strontium 38	137 Ba barum 56	[226] Ra radium 88
_	7 Li Ilithium 3	23 Na sodium 11	39 potassium 19	Rb rubidium 37	133 Cs caesium 55	[223] Fr francium 87
•			<u></u>		<u></u>	

^{*} The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.





1. Ethene and propene are alkenes.

Alkenes can be reacted to form polymers.

The table gives some information about ethene and propene and the polymers they form.

alkene	formula of molecule	structure of molecule	name of polymer formed from alkene	repeating unit in polymer
ethene	$\mathrm{C_2H_4}$		poly(ethene)	
propene		H CH ₃ C=C H		H CH ₃ -C-C- H H

(a)	Complete	the	table.

(4)

(1)

(b) Alkenes are unsaturated hydrocarbons.

Explain why alkenes are described as unsaturated.

(1)

(c) Bromine water is orange.

Describe what you would see when ethene is shaken with a small amount of bromine water.

(1)

(d) Ethene can be produced by cracking long chain alkane molecules.

What is meant by cracking?



(e)	Delegged and the second and the seco
(-)	Poly(ethene) is waterproof and almost colourless. Suggest a use for poly(ethene) which depends on these properties.
	(1)
(f)	Describe problems that arise when poly(ethene) waste is put in a landfill site.
	(2)
	(Total 10 marks)

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2.	The The	ey ar	and potassium are in group 1 of the periodic table. e alkali metals. etronic configuration of a sodium atom is 2.8.1 etronic configuration of a potassium atom is 2.8.8.1
	(a)	_	plain, in terms of the electronic configurations of their atoms, why sodium and assium have similar reactions.
		••••	(1)
	(b)	A s	odium ion has the formula Na ⁺ .
		(i)	What is an ion?
			(1)
		(ii)	Give the symbol of a potassium ion.
		` /	
			(1)
	(c)	Sod	lium forms salts which are ionic compounds.
		(i)	Ionic compounds have high melting points.
			Explain why.
			(2)
		(ii)	Sodium sulphate is a salt. Sulphate ions have the formula SO_4^{2-} .
			Give the formula of sodium sulphate.
			(1)
			(Total 6 marks)



3. Ammonia is produced in industry by the Haber process. The equation for the reaction is

$$N_2 + 3H_2 \rightleftharpoons 2NH_3$$

(a) 280 tonnes of nitrogen is mixed with the correct amount of hydrogen for complete reaction.

(i)	Calculate 1	the	maximum	mass	of	ammonia	that	could	be	formed	if	all	of	the
	nitrogen re	eacte	ed.											
	(Relative f	orm	ula masses	$N_2 = $	28	$H_2 = 2.0$; NH	$L_3 = 17$)					

•••••	 	•••••	•••••

Answer =	tonnes
	(2)

(ii) In another reaction, it is calculated that, if all of the nitrogen reacted, 151 tonnes of ammonia would be formed.

When the reaction occurs, only 21.0 tonnes of ammonia is formed. Calculate the percentage yield of ammonia in this reaction.

 	•••••	•••••	•••••

- (b) In the Haber process the reaction is carried out at a pressure of about 200 atm. In another process, this reaction has been carried out at a much higher pressure of about 1000 atm.
 - (i) A higher yield is obtained at 1000 atm than at 200 atm. Explain why.



(2)



(ii)	Suggest a disadvantage of using a pressure as high as 1000 atm in the manufacture of ammonia.	Leave blank
	(1) (Total 6 marks)	Q3

4. Jetpacks can be used to lift people into the air and transport them over short distances. The photographs show a man with a jetpack strapped to his back.



Some jetpacks contain hydrogen peroxide. The hydrogen peroxide decomposes rapidly to form oxygen and water. This rapid release of oxygen from the jetpack lifts the person off the ground.

(a)	Write the balanced equation for the decomposition of hydrogen peroxide, H ₂ oxygen and water, H ₂ O.	${}_{2}O_{2}$, to
		(2)

(b) Draw a dot and cross diagram to show the arrangement of electrons in a molecule of water.

Show outer electrons only.

(2)



Leave blank

(1) The decomposition of hydrogen peroxide is exothermic. (i) What is meant by the term exothermic? (1) (ii) During the reaction, some bonds are broken and some bonds are formed. Explain, in terms of the breaking and forming of bonds, why the reaction is exothermic. (2) (Total 8 marks)	(ii) During the reaction, some bonds are broken and some bonds are formed. Explain, in terms of the breaking and forming of bonds, why the reaction exothermic. (Total 8 mar	on is (2)
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The decomposition of hydrogen peroxide is exothermic.		
The decomposition of hydrogen peroxide is exothermic.		•••••
	The decomposition of hydrogen peroxide is exothermic.	
(1)		
		······ (1)
		•••••
	In a jetpack, silver powder is present to make the reaction much faster. The silver powder remains unchanged at the end of the reaction.	



