EDEXCEL GCSE ADDITIONAL SCIENCE (360SCIENCE)

SCIENCE



EXAM QUESTION PACK

UNIT C2 FOUNDATION TIER 5018F PAPERS

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

Paper Reference(s)

5018F/1F 5038F/1F

Edexcel GCSE

Additional Science (5018F)

Chemistry (5038F)

C2 – Topics 5 to 8

Foundation Tier

Tuesday 7 June 2011 – Afternoon

Time: 30 minutes

Materials required for examination
Calculator

Items included with question papers
Nil

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
Total	

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.
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (~~☒~~) and then mark your new answer with a cross (☒).
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 5 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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The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 **H** hydrogen 1										4 **He** helium 2
7 **Li** lithium 3	9 **Be** beryllium 4											11 **B** boron 5	12 **C** carbon 6	14 **N** nitrogen 7	16 **O** oxygen 8	19 **F** fluorine 9	20 **Ne** neon 10
23 **Na** sodium 11	24 **Mg** magnesium 12											27 **Al** aluminium 13	28 **Si** silicon 14	31 **P** phosphorus 15	32 **S** sulfur 16	35.5 **Cl** chlorine 17	40 **Ar** argon 18
39 **K** potassium 19	40 **Ca** calcium 20	45 **Sc** scandium 21	48 **Ti** titanium 22	51 **V** vanadium 23	52 **Cr** chromium 24	55 **Mn** manganese 25	56 **Fe** iron 26	59 **Co** cobalt 27	59 **Ni** nickel 28	63.5 **Cu** copper 29	65 **Zn** zinc 30	70 **Ga** gallium 31	73 **Ge** germanium 32	75 **As** arsenic 33	79 **Se** selenium 34	80 **Br** bromine 35	84 **Kr** krypton 36
85 **Rb** rubidium 37	88 **Sr** strontium 38	89 **Y** yttrium 39	91 **Zr** zirconium 40	93 **Nb** niobium 41	96 **Mo** molybdenum 42	[98] **Tc** technetium 43	101 **Ru** ruthenium 44	103 **Rh** rhodium 45	106 **Pd** palladium 46	108 **Ag** silver 47	112 **Cd** cadmium 48	115 **In** indium 49	119 **Sn** tin 50	122 **Sb** antimony 51	128 **Te** tellurium 52	127 **I** iodine 53	131 **Xe** xenon 54
133 **Cs** caesium 55	137 **Ba** barium 56	139 **La*** lanthanum 57	178 **Hf** hafnium 72	181 **Ta** tantalum 73	184 **W** tungsten 74	186 **Re** rhenium 75	190 **Os** osmium 76	192 **Ir** iridium 77	195 **Pt** platinum 78	197 **Au** gold 79	201 **Hg** mercury 80	204 **Tl** thallium 81	207 **Pb** lead 82	209 **Bi** bismuth 83	[209] **Po** polonium 84	[210] **At** astatine 85	[222] **Rn** radon 86
[223] **Fr** francium 87	[226] **Ra** radium 88	[227] **Ac*** actinium 89	[261] **Rf** rutherfordium 104	[262] **Db** dubnium 105	[266] **Sg** seaborgium 106	[264] **Bh** bohrium 107	[277] **Hs** hassium 108	[268] **Mt** meitnerium 109	[271] **Ds** darmstadtium 110	[272] **Rg** roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

**** 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.

Leave blank

1. Each part of this question describes an element.
The answer to each part is one of the elements in this box.

aluminium	bromine	carbon	chlorine	iron	nitrogen

Give the name of the element described.
Each element may be used once, more than once, or not at all.

(a) This element is a metal.
It is found in all steels.

.....

(1)

(b) This element has the atomic symbol C.
It has three forms, diamond, graphite and Buckminsterfullerene.

.....

(1)

(c) This element is combined with hydrogen in ammonia, NH_3.

.....

(1)

(d) This element is a halogen in group 7 of the periodic table.
It dissolves in water to form an orange solution.
When the solution is shaken with ethene, an alkene, the mixture changes from orange to colourless.

.....

(1) **Q1**

(Total 4 marks)

Leave blank

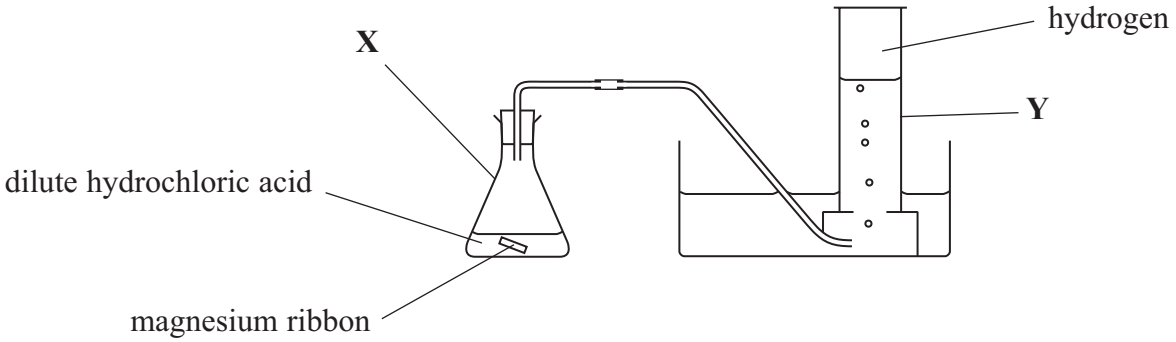
2. Magnesium reacts with dilute hydrochloric acid.
Magnesium chloride and hydrogen are formed.

(a) Complete the word equation for this reaction.

..... + hydrochloric acid → ..... + ...

(2)

(b) In a practical investigation, the reaction is carried out in the apparatus shown.



Give the name of the pieces of apparatus **X** and **Y**.

X .....

Y .....

(2)

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Leave blank

(c) In a practical investigation, four experiments were carried out.

Experiment 1 is carried out by reacting some magnesium ribbon with excess dilute hydrochloric acid at room temperature.

Three more experiments were carried out.
In each experiment, the only change from experiment 1 is described.

Experiment 2 – powdered magnesium was used instead of magnesium ribbon
Experiment 3 – colder acid was used instead of acid at room temperature
Experiment 4 – the gas was collected in a gas syringe instead of over water in apparatus Y

For each experiment tick (✓) one box to show whether the change makes the reaction faster, slower or has no effect.

experiment	change	faster	slower	no effect
2	use powdered magnesium			
3	use colder acid			
4	collect the gas in a gas syringe			

(3)

(d) This reaction is exothermic.
How could you show this?

.....

.....

.....

(1)

Q2

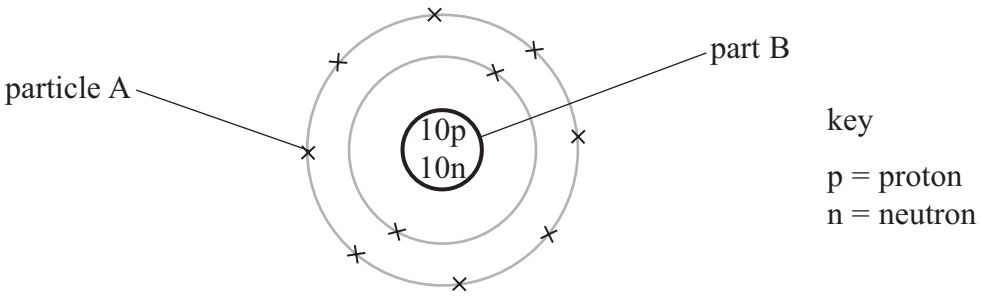
(Total 8 marks)

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3. The diagram shows an atom of an element.



(a) (i) Give the name of particle A.

.....

(1)

(ii) Give the name of part B of the atom.

.....

(1)

(b) (i) Use the diagram to give the electronic configuration of this atom.

Put a cross (☒) in the box to show your answer.

2.8 ☒

8 ☒

8.2 ☒

10 ☒

(1)

(ii) Use the periodic table to give the **symbol** of this atom.

.....

(1)

(iii) This element is found in group 0 of the periodic table.
It is very unreactive.
Explain why.

.....

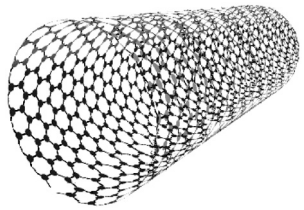
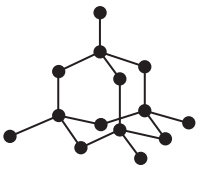
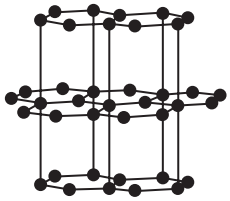
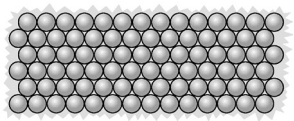
.....

(1) **Q3**

(Total 5 marks)

Leave blank

4. Parts of the structure of four substances are shown.

carbon nanotube	diamond	graphite	lithium
			

(a) Carbon nanotubes are strong, hard and conduct electricity.
Suggest a use for carbon nanotubes.

.....

(1)

(b) Give the names of the other **two** substances in the table that conduct electricity.

.....

(1)

(c) Diamond has a high melting point.
Explain why.

.....

.....

.....

.....

(2)

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Leave blank

(d) (i) Some people use homeopathic medicines.
Some homeopathic medicines are very dilute solutions of natural substances.
In one dose of these medicines, there is an extremely small amount of the natural substances.

Why might some people think that homeopathic medicines do not work?

.....

.....

.....

(1)

(ii) In the molecules of many natural substances, the atoms are bonded together by shared pairs of electrons.

What type of bond is a shared pair of electrons?

.....

(1)

Q4

(Total 6 marks)

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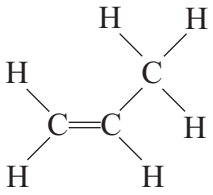
5. One molecule of propane can be cracked to form one molecule of propene, C_3H_6, and one molecule of another gas.

(a) Complete the balanced equation for this reaction.

..... → C_3H_6 + ...

(2)

(b) The structure of a molecule of propene is shown.



(i) Calculate the relative formula mass of propene, C_3H_6.
(Relative atomic masses H = 1.0, C = 12)

.....

answer = ...

(1)

(ii) The propene molecule is unsaturated.
Explain why the molecule is said to be unsaturated.

.....

.....

.....

(1)

(iii) Many propene molecules can react together to form a polymer.
Give the name of the polymer formed.

.....

(1)

(iv) When this polymer is manufactured, the reaction has a very high atom economy.
Apart from profit, why is a high atom economy an advantage?

.....

.....

.....

(1)

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Leave blank

(v) Propene reacts with hydrogen chloride to make chloropropane.

The word equation for this reaction is

propene + hydrogen chloride → chloropropane

Ethene reacts with hydrogen chloride in a similar way.
Suggest the name of the product that will be formed by completing the word equation.

The word equation for this reaction is

ethene + hydrogen chloride → .....

(1) **Q5**

(Total 7 marks)

TOTAL FOR PAPER: 30 MARKS

END

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Mark Scheme (Results)

June 2011

360Science

GCSE Additional Science
Structured Paper C2 (5018F/1F)

GCSE Chemistry
Structured Paper C2 (5038F/1F)

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5018F & 5038F Mark Scheme
June 2011

Question Number	Answer	Allow	Reject/ Ignore	Mark
1(a)	iron;		Ignore symbols	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
1 (b)	carbon;		Ignore symbols	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
1(c)	nitrogen;		Ignore symbols	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
1(d)	bromine;		Ignore symbols	**(1)**

Question Number	Answer	Allow	Reject	Mark
2 (a)	magnesium / Mg (+ hydrochloric acid →) magnesium chloride / $MgCl_2$ + hydrogen / H_2 ;; Mixture of words and correct symbols allowed eg magnesium (+ hydrochloric acid →) magnesium chloride + H_2 ;;	Allow 1 mark for 1 error in equation	H MGCl2 MgCl2 MgCL2	**(2)**

Question Number	Answer	Allow	Reject	Mark
2(b)	**A** flask / conical flask ; **B** gas jar / measuring cylinder ;		Other items	**(2)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
2 (c)				**(3)**

experiment	**change**	**faster**	**slower**	**no effect**
2	use powdered magnesium	✓ ;		
3	use colder acid		✓ ;	
4	collect the gas in a syringe			✓ ;

Question Number	Answer	Allow	Reject/ Ignore	Mark
2 (d)	use thermometer / temperature rise / measure temperature (before and after) / feels hot ;			**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
3(a)(i)	electron;		symbol e	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
3(a(ii)	nucleus;			**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
3(b)(i)	2.8 ;			**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
3(b)(ii)	Ne ;		Ignore neon Reject NE or ne	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
3(b) (iii)	full outer shell / 8 electrons in the outer shell ;	no need to gain or lose electrons	ignore no spare electrons / spaces	**(1)**

Question Number	Answer	Allow	Reject	Mark
4(a)	any suitable use e.g. composite fibres / polymers/ bike parts / solar cells/ capacitors / nanoscale electric motors; sensors / touchscreens / stab-proof clothing / fuel cells / TV screen ;	Allow any use that makes use of one of the properties e.g. (electrical) wires / cables, computers	Wire where a fence etc is implied, e.g. chicken wire Very large scale uses e.g. overhead cables, girders etc Light bulb	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
4 (b)	graphite **AND** lithium ; **Note:** Must have both for mark			**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
4(c)	Any **two** from 1. strong (covalent) **bonds** ; 2. it is a giant structure / lattice ; 3. requires lot of energy / heat to break **bonds**; 4. each carbon atom bonded to four other carbon atoms ;	Cannot score 1 if referring to ionic bonds etc. Cannot score 2 if referring to ionic lattice etc		**(2)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
4 (d)(i)	too few molecules to work / not enough data to support ideas / no (scientific) proof for treatment / eq ;		Ignore references to 'very dilute' or 'small amount' Ignore idea that natural substances are ineffective	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
4(d)(ii)	covalent ;			**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
5 (a)	C_3H_8 ; (C_3H_6 +) H_2 ;	multiples e.g. 2 C_3H_8 2 C_3H_6 + 2 H_2 etc If 1 formula correct scores 1 mark whatever balancing applied; if two formulae correct scores 2 marks only if balancing correct, otherwise 1 mark		**(2)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
5 (b)(i)	3 x 12 + 6 ; (= 42)			**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
5 (b)(ii)	contains (one) double bond / double bonds / >C=C< ;		Ignore spare bonds / references to alkenes Ignore references to carbon not bonded to maximum number of hydrogens	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
5 (b)(iii)	poly(propene);	polypropene	Incorrect spelling	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
5 (b)(iv)	little or no waste / little by-products / high % reactants end up as products ;	High output compared to low input	Reject references to yield / quantity produced / energy / environment	**(1)**

Question Number	Answer	Allow	Reject/ Ignore	Mark
5 (b)(v)	chloroethane ;		chloroethene	**(1)**

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Additional Science 5018F/1F
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C2 Mark Scheme

Question Number	Answer	Mark
1(a)(i)	metal ;	**(1)**

Question Number	Answer	Mark
1(a)(ii)	contains free electrons ;	**(1)**

Question Number	Answer	Mark
1(a)(iii)	the element that is the main part of steel ;	**(1)**

Question Number	Answer	Mark
1(b)	sodium ; [Reject Na] chlorine ; [Reject Cl, Cl_2]	**(2)**

Question Number	Answer	Mark
2(a)	alkanes ;	**(1)**

Question Number	Answer	Mark
2(b)	C_2H_6 ;	**(1)**

Question Number	Answer	Mark
2(c)	each carbon atom forms four stable bonds ;	**(1)**

Question Number	Answer	Mark
2(d)	12 + 4; (= 16)	**(1)**

Question Number	Answer	Mark
2(e)(i)	yellow / orange / red / brown ; (any combinations of the above colours allowed, reject other combinations eg yellow-blue)	**(1)**

Question Number	Answer	Mark
2(e)(ii)	It is an alkane /it is not an alkene / no double bonds/ saturated/ no reaction ;	**(1)**

Question Number	Answer	Mark
3(a)	**Surface area mark**: larger surface area / (powder has) smaller pieces / more marble exposed / more contact with acid / OWTTE; **Collisions mark:** more (frequent) collisions ;	**(2)**

Question Number	Answer	Mark
3(b)	hotter acid / heat / raise temperature /use more concentrated acid (allow stronger) acid / (suitable) catalyst ;	**(1)**

Question Number	Answer	Mark
3(c)(i)	(biological) catalyst / speeds up reactions ; Ignore answers such as 'breaks up food' – this is a definition of digestion which is in the stem	**(1)**

Question Number	Answer	Mark
3(c)(ii)	**advantage**: plants grow more or faster or better / (can be sold as) organic / cheaper (than man-made fertilisers) / no (man-made) chemicals added [however, ignore any idea that man made chemicals are harmful] / 'natural' / higher selling price (of produce) / improve soil structure ; Ignore 'healthier', does not cause pollution, or any idea that crops are better, tastier etc **disadvantage**: variable or unknown composition / 'less concentrated' in nutrients – must use more / can cause pollution in rivers etc ;	**(2)**

Question Number	Answer	Mark
4(a)	P ; [Allow B, Boron]	**(1)**

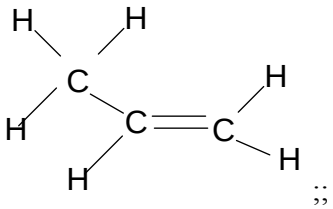
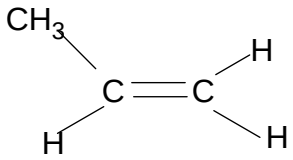
Question Number	Answer	Mark
4(b)	S ; [Allow Ar, Argon] [Reject A, AR]	**(1)**

Question Number	Answer	Mark
4(c)	R ; [Allow K, Potassium]	**(1)**

Question Number	Answer	Mark
4(d)	Q ; [Allow F, Fluorine]	**(1)**

Question Number	Answer	Mark
5(a)(i)	**Need two points:** **-Idea of chain** large molecule / chain / 'repeating' or 'joining' (unit of some sort) **-Second idea** made from (small) molecules / alkenes / monomers / hydrocarbons / small chain (molecules) ; [Ignore references to plastic]	**(1)**

Question Number	Answer	Mark
5(a)(ii)	only **one** type of (single) monomer / only **one** product / made from alkene;	**(1)**

Question Number	Answer	Mark
5(b)	 ;; allow  (note: H_3 – C bond as shown above is allowed) Allow molecule with **one** C=C bond (carbons do not have to be tetravalent) for one mark (molecule can have any number of carbons); [Allow correct dot and cross diagram Molecules with no double bonds will score zero]	**(2)**

Question Number	Answer	Mark
5(c)	**First mark:** >C=C< bond breaks / double bond(s) break / opens up / OWTTE ; **Second mark – dependent on first being awarded:** then form new (covalent) bond / molecules then bond / join / form chain / link ; [Ignore 'combine' here]	**(2)**

Question Number	Answer	Mark
5(d)	any **two** of: • melts or softens ; • molecules would slide or move or separate ; [Ignore particles/ atoms] • no or weak cross-links or inter-molecular forces (between molecules) ; [Allow 'bonds' ONLY if it is absolutely clear they are inter-molecular eg - 'weak bonds' NO, - 'weak bonds between molecules' YES - 'no intermolecular bonds' YES] [Ignore idea of bonds/ forces breaking or weakening] [Allow layers/ chains instead of molecules]	**(2)**

Question Number	Answer	Mark
5(e)	conserves resources / oil / energy / prevents waste or rubbish / cuts down landfill use / cuts down CO_2 release if they are burnt instead / new polymer articles can be made / slow degradation / non-biodegradable ; [Ignore 'better for environment' 'prevents pollution' etc as too vague]	**(1)**

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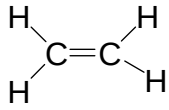
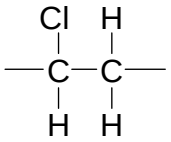
Question Number	Answer	Mark
1(a)(i)	hydrogen; Ignore H_2 or H Reject Nitrogen or N	**(1)**

Question Number	Answer	Mark
1(a)(ii)	covalent;	**(1)**

Question Number	Answer	Mark
1(b)(i)	1. protons – in nucleus/ centre (of atom); 2. neutrons -in nucleus/ centre (of atom); 3. electron – around the nucleus/ outside the nucleus/ in shell(s)/ in orbits/ orbiting nucleus [Reject **outer** shells, around the edge OWTTE];	**(3)**

Question Number	Answer	Mark
1(b)(ii)	14;	**(1)**

Question Number	Answer	Mark
1(b)(iii)	number of protons;	**(1)**

Question Number	Answer	Mark
2(a)	 ;  ; [Note: must have all 7 bonds as shown] poly(ethene); Accept polyethene/ polythene	**(3)**

Question Number	Answer	Mark
2(b)	a plasticizer;	**(1)**

Question Number	Answer	Mark
2(c)(i)	toxic/ poisonous/ harmful fumes may be formed/ releases carbon dioxide/ greenhouse gases/ may lead to global warming; Ignore pollution	**(1)**

Question Number	Answer	Mark
2(c)(ii)	not biodegradable/ doesn't rot/ takes long time to decompose OWTTE/ uses up (landfill) space; Ignore references to emitted gases/ leaching	**(1)**

Question Number	Answer	Mark
3(a)	mixture of metals; Accept compound of metals	**(1)**

Question Number	Answer	Mark
3(b)	alloy is strong(er)/ copper is (too) soft/ alloy (more) hardwearing; Ignore corrosion/ cost arguments/ density Reject rusting	**(1)**

Question Number	Answer	Mark
3(c)(i)	electrolysis/ electroplating/ copper plating;	**(1)**

Question Number	Answer	Mark
3(c)(ii)	1. Reference to charge: positive copper ions/ negative electrode/ negative disc/ negative steel; 2. Attraction of opposite charges; Reject any answers involving magnetic attraction	**(2)**

Question Number	Answer	Mark
4(a)	temperature rise ; Accept heat evolved	**(1)**

Question Number	Answer	Mark
4(b)	repeat experiment (to achieve similar results);	**(1)**

Question Number	Answer	Mark
4(c)	powder had greater surface area/ more contact or collisions between magnesium and acid ;	**(1)**

Question Number	Answer	Mark
4(d)	dilute the acid more/ cooler temperature of acid/ fold magnesium ribbon; Reject changes in amount of magnesium or acid	**(1)**

Question Number	Answer	Mark
5(a)(i)	heat/ high temperature/ catalyst (can be specified); Ignore pressure	**(1)**

Question Number	Answer	Mark
5(a)(ii)	alkene; Ignore named alkenes	**(1)**

Question Number	Answer	Mark
5(a)(iii)	contains C=C/ double bond/ not bonded with the maximum number of atoms or groups/ triple bond; Ignore spare bonds	**(1)**

Question Number	Answer	Mark
5(b)	molecule **B** with explanation: contains more (than one) C=C or double bond/ 2 double bonds;	**(1)**

Question Number	Answer	Mark
5(c)(i)	weaker (inter-molecular forces) (in polyunsaturates) ORA;	**(1)**

Question Number	Answer	Mark
5(c)(ii)	hydrogen/ H_2 ;	**(1)**

Question Number	Answer	Mark
5(d)(i)	(biological) catalyst/ controls reactions; Ignore references to break down of food (in question)	**(1)**

Question Number	Answer	Mark
5(d)(ii)	Lack of food breakdown, energy release etc **leads to** explained impact on body / body systems shut down/ metabolism slows OWTTE; Ignore references to disease fighting/ bacteria etc	**(1)**