



2012 Chemistry

Intermediate 1

Finalised Marking Instructions

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General information for markers

The general comments given below should be considered during all marking. It should be noted that these are general marking principles and may be superseded by decisions made at the Markers' Meeting.

1. Markers are reminded to read candidate responses **in their entirety**. If the candidate shows a clear understanding of the chemistry but does not use the exact words of the Marking Instructions they should still be given credit.
2. Markers are reminded that **no** comments are to be written on scripts. Comments such as 'ARITH', 'ERROR' and 'BOD' (Benefit of doubt) are **not** acceptable.
3. A guiding principle in marking is to give credit for (partially) correct chemistry rather than to look for reasons not to give marks.

Example: A student measured the pH of four carboxylic acids to find out how the strength is related to the number of chlorine atoms in the molecule. The results are shown.

Structural Formula	pH
CH ₃ COOH	1.65
CH ₂ ClCOOH	1.27
CHCl ₂ COOH	0.90
CCl ₃ COOH	0.51

How is the strength of the acids related to the number of chlorine atoms in the molecule?

Although not completely correct, an answer such as "the more Cl₂, the stronger the acid" should gain the full mark.

4. Marks should **not** be deducted for incorrect spelling or loose language as long as the meaning of the word(s) is conveyed.

Example: Answers like "hydrolic acid" (for "hydrochloric acid") and "it gets hotter" (for "the temperature rises") should be accepted.

However the example below would not be acceptable, as an incorrect chemical term, which the candidate should know, has been given.

Example: If the correct answer is "polyethene", and the candidate's answer is "polyethane", this should not be accepted.

5. A right answer followed by a wrong answer should be treated as a cancelling error and no marks should be given.

Example: What is the colour of universal indicator in acid solution?

The answer "red, blue" gains no marks.

6. If a right answer is followed by additional information which does not conflict, the additional information should be ignored, whether correct or not. However, if selecting information from the Data Booklet is required, the information selected must be relevant and correct, as this would negate.
7. Full marks should be awarded for the correct answer to a calculation on its own; the part marks shown in the Marking Instructions are for use when working is given.
8. A half mark should be deducted in a calculation for each arithmetic slip.
9. A half mark should be deducted for incorrect or missing units **only when stated in the Marking Instructions.**
10. A half mark should be deducted for transcription errors.
11. Where a wrong numerical answer (already penalised) is carried forward to another step, no further penalty is incurred provided the end result is used correctly.
12. A symbol or correct formula should be accepted in place of a name **unless stated otherwise in the Marking Instructions.**
13. If an answer comes directly from the text of the question, no marks should be given.

Example: Propane burns to give out energy.

Name the type of chemical reaction taking place.

No marks should be given for “burning” since the word “burns” appears in the text.

14. Unless the question is clearly about a non-chemistry issue, eg costs in industrial chemistry, a non-chemical answer gains no marks.

Example: Why does the (catalytic) converter have a honeycomb structure?

A response such as “to make it work” may be correct but it is not a chemical answer and the mark should not be given.

15. When it is very difficult to make a decision about a partially correct answer, a half mark can be awarded.
16. When marks have been totalled, a half mark should be rounded up.

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Marking scheme

Section A

1	D	11	A
2	A	12	D
3	B	13	A
4	C	14	C
5	D	15	B
6	B	16	B
7	C	17	D
8	D	18	C
9	A	19	C
10	B	20	A

Section B

Question		Full mark	½ mark	0 mark	Cancel
1	(a)	Lithium, carbon and oxygen Li, C or O/O ₂ ignore O ₂ /O ² All 3 for 1 mark Any order, allow loose spelling		Lithium, carbon dioxide and oxygen.	
	(b)	magnesium + oxygen → magnesium oxide or oxygen + magnesium → magnesium oxide accept any symbols/formula all correct 1 mark			

Question		Full mark	½ mark	0 mark	Cancel
2	(a)	Metal Liquid ½ mark ½ mark			
	(b)	Toxic/poisonous Ignore loose spelling		Dangerous/harmful Deadly/irritant/can kill you/hazardous	
	(c)	$\frac{4}{40}$ ½ mark =0.1 ½ mark 0.1 on its own 1 mark	$\frac{4}{40}$ only Arithmetic mistake 10 with working shown	10 on its own $\frac{4}{40} \times 3$	

Question		Full mark	½ mark	0 mark	Cancels						
3	(a)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Acid</th> <th>Alkali</th> </tr> </thead> <tbody> <tr> <td>vinegar</td> <td>bleach</td> </tr> <tr> <td>lemonade</td> <td>baking soda</td> </tr> </tbody> </table> <p>All 4 correct 1 mark</p>	Acid	Alkali	vinegar	bleach	lemonade	baking soda	2/3 entries correct ½ mark	1 correct entry only	
Acid	Alkali										
vinegar	bleach										
lemonade	baking soda										
	(b)	(i)		Chlorine/Cl/Cl ₂ /Cl ² / Cl ²							
		(ii)		Becomes alkali/ increase above 7/ decrease/ equalises it/ goes green							

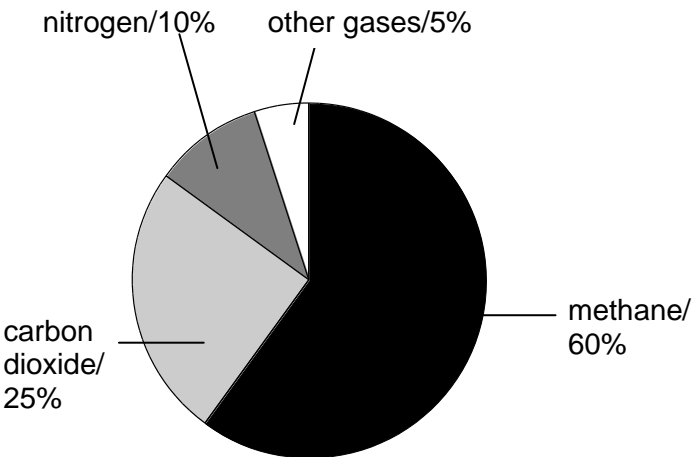
Question		Full mark	½ mark	0 mark	Cancel
4	(a)	Reshaped on heating/ Changes shape on heating/ Melts and can be reshaped/be bent when heated Can be heated and shaped and when reheated returns to original shape Becomes flexible when heated Idea of heat/melting and reshaping both required for 1 mark	Will melt	Changes shape/ Burns and can be reshaped/any description of thermal insulator/can be moulded into different shapes/plastic with memory	
	(b)	Si		Incorrect symbol – SI/si/Si2	
	(c)	Low density/ Lightweight/light Strong/ Flexible/not rigid/ Does not rust/resistant to corrosion/Easy to carry		Good electrical conductor Malleable Ductile Easily worked	Good electrical conductor

Question	Full mark	½ mark	0 mark	Cancels
5 (a)	Lime water/ Limewater			
(b)	Less (time) Shorter (time) Decreases the (time taken) Speed up the <u>time</u> Faster/quicker <u>time</u>	Faster (reaction)/ Quicker/increases <u>speed</u> /speed it up/fizz quicker/turns milky faster	It would increase/ Increases Slow down	
(c)	Keeps the body healthy/ Keep body working properly/ Body functions better/properly/ Prevents diseases/ Healthy body growth/ Helps immune system Ignore correct irrelevant information		Energy/repairs tissues/growth of body/keeps us fit/makes us strong/keeps bones strong/help us grow/to make it balanced	keeps bones strong Energy Answer relating to proteins/ fats/fibres/ minerals/ carbohydrates

Question	Full mark	½ mark	0 mark	Cancels
6 (a)	Decreases/ Weakens/ Less strong Any description of weakening or implied Eg falls apart/breaks/falls down/peels/turns flaky/brittle/becomes unstable/disintegrate/wear away/wobbly		Changes colour It rots Less dense Becomes a new substance No longer a metal	
6 (b)	Painting/ Greasing/ Electroplating/ Galvanising/zinc coating Tin-plating/ Sacrificial protection/ Attach to a more reactive metal/ Attach magnesium/ Plastic-coating/ Varnish/ Coat it with a substance that is waterproof/ or implication that it is waterproof Dip coating/ Oiling/ Any metal coating (not Hg/K/Li/Na/Ca)		A mercury coating/ Glaze it/ Name of metal on its own e.g. zinc Coat it with something/ anodising	

Question	Full mark	½ mark	0 mark	Cancels
(c)	Salt (is present)/ Ions (are present) Salt reacts with iron to make it rust/ Salt reacts with metal Salty and acidic Salt is a catalyst Any mention of salt or ions – no cancelling		Contains oxygen/seawater acts like a catalyst Because of the acidity of the seawater	
(d)	Zinc/ Aluminium/ Magnesium Accept any attempt at symbols – must be recognisable as the metal		Sodium/potassium/ lithium/calcium	

Question	Full mark	½ mark	0 mark	Cancels
7 (a)	<p>To place the metals in order of reactivity/corrosion To find out the reactivity of zinc, magnesium and copper/ To find out how reactive the metals are/ To see which metals react with acid and which don't/ To see which metals corrode fastest/ To see what/how metals react with acid</p> <p>Must be some reference to more than one metal.</p>	<p>To see which is the most reactive To see which reacts the most/quickest/fastest/best To see which metal is the most reactive/better reaction To see which metal reacts the fastest To see which metal reacts Implication that its only about one metal</p>	Any mention of rusting/dissolving	Any mention of rusting/dissolving
(b)	<p>Concentration (of acid)/ Temperature (of acid)/ Size/length of metal/ any pupil description of size Mass/weight (of metal)/ Type of acid/ Amount of time (in acid) Specified temperature</p>	Amount of metal	<p>Size of test tube Volume/depth of acid Same/types metals Volume of metal</p>	
(c)	<p>Hydrogen/ H/ H₂/ H₂/ H²/ h</p>			

Question	Full mark	½ mark	0 mark	Cancels
8 (a)	They can be replaced/re-made/re-created/more can be made quickly/reproduced	Won't run out Not finite unlimited	Can be recycled/reused (non cancelling) renewed	
(b)	Carbon dioxide ½ mark Water ½ mark Accept formula, numbers must be present but ignore position	Carbon dioxide only Water only Water and anything else Carbon dioxide and anything else		
(c)	 <p data-bbox="421 1197 1115 1300">All correct for 1 mark Word or percentage or mixture or abbreviations or initials</p>			

Question	Full mark	½ mark	0 mark	Cancel
9 (a)	Carbon dioxide ½ mark Water ½ mark Accept formula but ignore position of numbers	Carbon dioxide only Water only Water and anything else Carbon dioxide and anything else		
(b) (i)	Increases and decreases/ Decreases and increases Both for 1 mark		Increases and increases Decreases and decreases	
(ii)	Less than 4 0 included		4 and any value above 4 negative numbers	
(iii)	Syringe/ Measuring cylinder/tube/beaker Ruler (and test-tube) burette		Test-tube Scale(s) Cylinder Volume cylinder beaker	
(c)	Relights a glowing splint Ignore any mention of pop after glowing splint relights		Glowing splint test/ Burns with a pop/ Lit splint relights/ Glowing splint pops/ Taper is relighted	

Question	Full mark	½ mark	0 mark	Cancels
10 (a)	D		D and any other letter circled	
(b)	Reduces/ Lowers/ Gets less/ Decreases/ Not be enough left Need to put more in Ignore any additional information			
(c)	Insoluble/ Not soluble Doesn't dissolve in water Calcium and/or phosphate not soluble		Doesn't contain ammonia/ammonium (not cancelling)	
(d)	Leave water lifeless/ Kills/harms fish/animals Algae bloom/ Poisons water/lakes Reduces oxygen levels in water Contaminates wildlife		Kills plants/crops Kills insects Pollution In water supply	Kills plants/crops Kills insects

Question	Full mark	½ mark	0 mark	Cancels
11 (a)	For growth and repair/ For growth/ For repair/heal Repair damaged tissues/muscles Mending tissues/heal wounds Muscles tissue	Build strength	Energy Heat you up Bones Minerals Teeth Body working properly Keep body healthy All cancelling	Energy Heat you up Bones Minerals Teeth Body working properly Keep body healthy
(b)	More protein/ Has 32 grams of protein/ Will have 2 grams more of protein/ Has more grams of protein Ignore extra information regarding bones/energy/calcium etc		Anything to do with energy Supplies calcium/omega 3 oils	
(c)	$C_2H_5N_1O_2$ / $C_2H_5NO_2$ C2H5N1O2 C2H5NO2	$C^2H^5N^1O^2$ $C^2H^5NO^2$ Mixture of superscript/subscript/normal		

Question	Full mark	$\frac{1}{2}$ mark	0 mark	Cancels
12 (a)	Ethanol content and (%) label $\frac{1}{2}$ mark Scale on ethanol content axis $\frac{1}{2}$ mark Bars labelled (x-axis label not required) $\frac{1}{2}$ mark Correct height of bars $\frac{1}{2}$ mark Allow $\frac{1}{2}$ box tolerance in plotting Allow 1 plotting error Allow abbreviations for mouthwash names - $\frac{1}{2}$ mark for using less than $\frac{1}{2}$ graph paper Max of 1 mark if line graph plotted – ethanol content (%) label and bars labelled Allow different widths of bars			
(b)	Poisonous/ Toxic/ Causes blindness/ Can kill/ Causes death		Harmful/unhealthy/ Dangerous/ Makes you sick Gets you drunk Harms liver	
(c)	Prevents tooth decay/ Protects teeth/ Keeps teeth strong		Kills bacteria/ Kills the plaque on teeth Helping teeth Good for teeth (all non-cancelling)	

[END OF MARKING INSTRUCTIONS]