



GCSE Further Additional Science

Foundation Tier

Unit 2 Chemistry 3F

**SPECIMEN MARK SCHEME
V1**

Quality of Written Communication and levels marking

In Question 9(b) candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

In order to attain a mark within a certain level, **both** the science **and** the QWC must be of a standard appropriate to that level.

COMPONENT NUMBER: Unit 2 Chemistry 3F

COMPONENT NAME: Further Additional Science

STATUS: Specimen v1

question	answers	extra information	mark
1(a)	Mendeleev		1
1(b)	atomic weight		1
1(c)	groups		1
1(d)	undiscovered		1
1(e)	electronic structures		1
Total			5

question	answers	extra information	mark
2(a)	sodium is a metal		1
	sodium forms ions with a +1 charge		1
2(b)(i)	A		1
2(b)(ii)	B		1
2(b)(iii)	hydrogen		1
Total			5

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STATUS: Specimen v1

question	answers	extra information	mark
3(a)(i)	dissolve		1
3(a)(ii)	calcium		1
3(b)(i)	easily makes lather with soap – soft water		1
	made soft by boiling – temporary hard water		1
3(c)	filter		1
	add chlorine	accept sterilise	1
Total			6

COMPONENT NUMBER: Unit 2 Chemistry 3F

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STATUS: Specimen v1

question	answers	extra information	mark
4(a)(i)	(gas X) nitrogen / N ₂		1
	(gas Y) hydrogen / H ₂		1
4(a)(ii)	cooled		1
4(b)	any two from: <ul style="list-style-type: none">• save materials / resources• save energy / fuels• reduce costs• reduce waste		2
4(c)(i)	low		1
	high		1
4(c)(ii)	40(%)		1
4(c)(iii)	any two from: <ul style="list-style-type: none">• using these conditions the yield is still high• higher pressures would increase yield but energy costs would be higher or <p>higher pressures would increase yield but would make the plant expensive to build</p> <ul style="list-style-type: none">• the temperature of 450°C would not need a lot of energy or <p>at 450°C the reaction would be faster than at lower temperatures</p>		2
Total			10

COMPONENT NUMBER: Unit 2 Chemistry 3F

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STATUS: Specimen v1

question	answers	extra information	mark
5(a)(i)	7 C-H bonds and 1 C-O-H bond		1
5(a)(ii)	ethanol dissolves in water to form a neutral solution		1
5(b)(i)	oxidation		1
5(b)(ii)	any one from: <ul style="list-style-type: none">• in vinegar• to make esters		1
Total			4

question	answers	extra information	mark
6(a)(i)	fizzing / effervescing		1
6(a)(ii)	cloudy / milky / white		1
6(b)	white		1
6(c)(i)	sodium chloride		1
6(c)(ii)	potassium ions give a lilac flame colour		1
	potassium's flame colour is masked by sodium's flame colour		1
Total			6

COMPONENT NUMBER: Unit 2 Chemistry 3F

COMPONENT NAME: Further Additional Science

STATUS: Specimen v1

question	answers	extra information	mark
7(a)(i)	iodine		1
7(a)(ii)	fluorine or chlorine		1
7(a)(iii)	2,7		1
7(a)(iv)	astatine		1
7(b)(i)	chlorine>bromine>iodine		1
7(b)(ii)	any two suitable comparisons about the extent to which the iron wool glowed eg chlorine is more reactive than bromine because iron glowed more brightly with chlorine than bromine (1) eg bromine is more reactive than iodine because iron glowed with bromine but not with iodine (1)		2
Total			7

COMPONENT NUMBER: Unit 2 Chemistry 3F**COMPONENT NAME: Further Additional Science****STATUS:** Specimen v1

question	answers	extra information	mark
8(a)(i)	activation energy or energy needed to start the reaction		1
8(a)(ii)	the reaction is exothermic because the energy level / value of products is less than the energy level / value of reactants	allow the reaction is exothermic because arrow B goes down or methanol is below methane and oxygen or arrow C is bigger than arrow A for 1 mark allow energy level of products is lower unqualified or the energy level of reactants is higher unqualified for 1 mark	2
8(b)(i)	use a lid / cover over the calorimeter or any mention of how the calorimeter could be safely enclosed / insulated		1
8(b)(ii)	a greater mass of methanol was burned in Experiment 2 therefore the temperature change was greater because more energy was transferred / released		1 1
8(b)(iii)	any one from: <ul style="list-style-type: none">• to improve or check repeatability / quality of results• to make it easier to spot an anomalous measurement• to be able to calculate an average mean value		1
8(b)(iv)	8820 (J)	for correct answer if answer is incorrect allow one mark for 21 used as the mean temperature change	2
Total			9

COMPONENT NUMBER: Unit 2 Chemistry 3F

COMPONENT NAME: Further Additional Science

STATUS: Specimen v1

question	answers	extra information	mark
9(a)	Drain Buster is a concentrated sodium hydroxide solution that would damage the skin		1
	therefore it is diluted so that it is safe to use for the experiment		1

9(b)

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 2.

0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	There is a brief description of the titration that may include a risk assessment.	There is some description of the titration that may include a risk assessment.	There is a clear, balanced and detailed description of the titration and an appropriate risk assessment.

examples of the chemistry points made in the response

- burette / acid / HCl used correctly
- pipette used for Drain Buster solution / alkali / NaOH correctly
- read meniscus at eye level
- acid / HCl added dropwise
- indicator used
- white background/tile
- end-point of titration recorded
- swirling / mixing
- repeat

example of risk assessment points made in the response eg

- Wear safety goggles – to protect eyes because hydrochloric acid is corrosive / irritant and / or sodium hydroxide is caustic

Total			8
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