Contents

Introduction

The purpose of this document is to provide guidance on constructing assessments for Higher Chemistry for gathering evidence for candidate estimates. This document should be read alongside *National Courses: guidance on gathering evidence and producing estimates* and *Higher Chemistry: Guidance on gathering key evidence in session 2020–21*.

The **key pieces** of evidence in chemistry are:

- a question paper, covering as much of the course as possible
- an end-of-course test or top-up question paper that includes the areas of the course not covered in the first examination
- end-of-topic tests that include grade A marks, which may be used as supplementary evidence to support the above question papers

You must gather these pieces of evidence in closed-book conditions and under a high degree of supervision and control. The closer the evidence is to the standard, format, and duration of the Higher Chemistry question paper the more realistic and reliable your estimates should be. You should form holistic judgements when considering candidate evidence and give greater weight to the evidence that mirrors the SQA question paper most closely.

Centres should have a robust evidence base for the grades they submit to SQA. In many subjects, candidate work on unseen tasks in supervised conditions will provide such evidence. How such evidence is generated is for the centre to decide, for example they may decide to split a question paper over a number of lessons. Ideally the centre will provide several opportunities for candidates to demonstrate what they know, understand and can do at appropriate points in the course delivery.

Assessment structure

Assessments should contain approximately 30% grade A marks which require candidates to demonstrate a consistently high performance in relation to the skills, knowledge and understanding for the course. Grade A marks relate to the level of demand of a question rather than the difficulty candidates may have with a question. This usually involves questions testing more complex higher order skills (and knowledge).

The remaining marks are accessible to most candidates, with the range and depth of answers differentiating between grade B candidates and grade C candidates. Candidates achieving a pass at Higher Chemistry will be required to demonstrate successful performance in relation to the skills, knowledge and understanding for the course.

If using past SQA paper questions to produce assessments, care should be taken not to take too many questions from the same past paper. Instead, questions should be drawn from a number of past paper sources. When constructing assessments, it is advised to construct section 2 (written) of the paper first, then to fill any gaps in coverage using section 1 (objective) questions.

Higher Chemistry question paper brief

	Marks		
Component	**Knowledge and understanding**	**Skills**	**Total**
Question paper	84+/-6	36+/-6	120

Knowledge and understanding/skills	**Percentage of marks**
♦ demonstrating knowledge and understanding of chemistry by making statements	~ 10
♦ demonstrating knowledge and understanding of chemistry by providing descriptions and explanations	~ 15
♦ applying knowledge and understanding of chemistry to new situations, interpreting information and solving problems	~ 45
♦ planning or designing experiments to test given hypotheses or to illustrate particular effects, including safety measures	~ 30
♦ selecting information	
♦ presenting information appropriately in a variety of forms	
♦ processing information (using calculations and units, where appropriate)	
♦ making predictions and generalisations based on evidence/information	
♦ drawing valid conclusions and giving explanations supported by evidence/justification	
♦ suggesting improvements to experimental procedures	

Additional information

Area Coverage	Chemical changes and structure	20 marks
	Nature's chemistry	40 marks
	Chemistry in society	40 marks
	Researching chemistry	10 marks
	Non-specific	10 marks
Two open-ended questions of three marks each.		
Grade A marks: approximately 30%.		

Breakdown of Higher Chemistry past papers 2019–2016

The following tables provide the structure of the questions in the SQA Higher Chemistry past papers (2019–2016) in section 1 and section 2 by key area, knowledge/skill, and grade A marks.

2019 – Section 1

Question	Area of Course	Question Type	Grade A
1	Types of chemical bond	Applying knowledge to new situations, interpreting, solving problems	
2	Types of chemical bond	Applying knowledge to new situations, interpreting, solving problems	
3	Oxidising and reducing agents	Applying knowledge to new situations, interpreting, solving problems	1
4	Oxidising and reducing agents	Applying knowledge to new situations, interpreting, solving problems	1
5	Alcohols	Applying knowledge to new situations, interpreting, solving problems	
6	Proteins	Applying knowledge to new situations, interpreting, solving problems	
7	Systematic carbon chemistry	Applying knowledge to new situations, interpreting, solving problems	
8	Oxidation of food	Applying knowledge to new situations, interpreting, solving problems	1
9	Carboxylic acids	Applying knowledge to new situations, interpreting, solving problems	
10	Fragrances	Applying knowledge to new situations, interpreting, solving problems	
11	Oxidation of food	Applying knowledge to new situations, interpreting, solving problems	
12	Non-specific	Selecting information	
13	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	1
14	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	
15	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	
16	Intermolecular forces	Applying knowledge to new situations, interpreting, solving problems	
17	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	
18	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	1
19	Getting the most from reactants	Processing information (using calculations and units)	1
20	Collision theory	Applying knowledge to new situations, interpreting, solving problems	
21	Chemical energy	Applying knowledge to new situations, interpreting, solving problems	
22	Collision theory	Applying knowledge to new situations, interpreting, solving problems	
23	Equilibrium	Applying knowledge to new situations, interpreting, solving problems	
24	Kinetic energy distribution	Applying knowledge to new situations, interpreting, solving problems	
25	Systematic carbon chemistry	Applying knowledge to new situations, interpreting, solving problems	1

2019 – Section 2

Question	Area of Course	Question Type	Grade A
1(a)(i)	Getting the most from reactants	Processing information (using calculations and units)	
1(a)(ii)A	Reporting experimental work	Planning or designing experiments	
1(a)(ii)B	Collision theory	Applying knowledge to new situations, interpreting, solving problems	
1(a)iii	Collision theory	Processing information (using calculations and units)	
1(b)	Collision theory	Knowledge and understanding - making statements	
1(c)(i)	Reaction pathways	Knowledge and understanding - making statements	
1(c)(ii)	Reaction pathways	Knowledge and understanding - making statements	
2(a)(i)	Periodicity	Knowledge and understanding - descriptions and explanations	
2(a)(ii)	Periodicity	Knowledge and understanding - descriptions and explanations	1
2(b)(i)	Periodicity	Applying knowledge to new situations, interpreting, solving problems	
2(b)(ii)	Periodicity	Knowledge and understanding - descriptions and explanations	
2(c)	Non-specific	Knowledge and understanding - descriptions and explanations	
2(d)	Non-specific	Processing information (using calculations and units)	
3	Types of chemical bond, intermolecular forces	Knowledge and understanding - descriptions and explanations	2
4(a)(i)	Proteins	Knowledge and understanding - making statements	
4(a)(ii)	Non-specific	Processing information (using calculations and units)	
4(b)(i)	Carboxylic acids	Applying knowledge to new situations, interpreting, solving problems	1
4(b)(ii)A	Chromatography	Processing information (using calculations and units)	
4(b)(ii)B	Chromatography	Selecting information	
4(c)	Esters, fats and oils	Knowledge and understanding - making statements	
4(d)(i)	Systematic carbon chemistry	Knowledge and understanding - descriptions and explanations	
4(d)(ii)	Esters, fats and oils	Applying knowledge to new situations, interpreting, solving problems	
4(d)(iii)	Fragrances	Knowledge and understanding - making statements	
4(e)(i)	Oxidation of food	Knowledge and understanding - making statements	
4(e)(ii)	Oxidation of food	Applying knowledge to new situations, interpreting, solving problems	
5(a)(i)	Chemical energy	Applying knowledge to new situations, interpreting, solving problems	
5(a)(ii)	Chemical energy	Knowledge and understanding - making statements	1
5(a)(iii)	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	
5(b)(i)	General practical techniques	Planning or designing experiments	1
Question	**Area of Course**	**Question Type**	**Grade A**
5(b)(ii)	Chemical energy	Applying knowledge to new situations, interpreting, solving problems	
5(b)(iii)	Getting the most from reactants	Suggesting improvements to experimental procedures	

6(a)(i)A	Alcohols	Applying knowledge to new situations, interpreting, solving problems	1
6(a)(i)B	Intermolecular forces	Applying knowledge to new situations, interpreting, solving problems	
6(a)(ii)	Systematic carbon chemistry	Applying knowledge to new situations, interpreting, solving problems	
6(a)(iii)	Non-specific	Processing information (using calculations and units)	
6(b)(i)	Alcohols	Applying knowledge to new situations, interpreting, solving problems	
6(b)(ii)A	Systematic carbon chemistry	Presenting information appropriately in a variety of forms	
6(b)(ii)B	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	
7(a)(i)	Skin care	Applying knowledge to new situations, interpreting, solving problems	
7(a)(ii)	Skin care	Applying knowledge to new situations, interpreting, solving problems	
7(a)(iii)	Skin care	Knowledge and understanding - making statements	
7(b)(i)	Esters, fats and oils	Applying knowledge to new situations, interpreting, solving problems	
7(b)(ii)	Esters, fats and oils	Applying knowledge to new situations, interpreting, solving problems	1
7(b)(iii)	Systematic carbon chemistry	Applying knowledge to new situations, interpreting, solving problems	
8(a)(i)	Proteins	Applying knowledge to new situations, interpreting, solving problems	1
8(a)(ii)	Intermolecular forces	Applying knowledge to new situations, interpreting, solving problems	
8(b)(i)	General practical techniques	Suggesting improvements to experimental procedures	1
8(b)(ii)	Reporting experimental work	Making predictions and generalisations	
8(c)(i)	Proteins	Drawing conclusions and giving explanations	
8(c)(ii)	Non-specific	Processing information (using calculations and units)	
9(a)(i)	Reaction pathways	Selecting information	
9(a)(ii)	Reaction pathways	Knowledge and understanding - descriptions and explanations	
9(b)	Common chemical apparatus, general practical techniques	Planning or designing experiments	1
9(c)	Chemical energy	Applying knowledge to new situations, interpreting, solving problems	
10(a)	Volumetric analysis	Planning or designing experiments	1
10(b)(i)	Common chemical apparatus	Planning or designing experiments	
10(b)(ii)	General practical techniques	Planning or designing experiments	1
10(b)(iii)	Getting the most from reactants	Applying knowledge to new situations, interpreting, solving problems	
Question	**Area of Course**	**Question Type**	**Grade A**
10(c)	Non-specific	Processing information (using calculations and units)	
11	Systematic carbon chemistry, oxidation of food, fragrances	Planning or designing experiments	2
12(a)(i)	Soaps, detergents and emulsions	Knowledge and understanding - making statements	

12(a)(ii)A	Soaps, detergents and emulsions	Knowledge and understanding - making statements	1
12(a)(ii)B	Soaps, detergents and emulsions	Knowledge and understanding - descriptions and explanations	1
12(iii)	Soaps, detergents and emulsions	Knowledge and understanding - making statements	1
12(b)(i)	Types of chemical bond	Knowledge and understanding - making statements	1
12(b)(ii)	Soaps, detergents and emulsions	Applying knowledge to new situations, interpreting, solving problems	
12(c)	Equilibria	Knowledge and understanding - descriptions and explanations	1
12(d)(i)	Oxidising and reducing agents	Applying knowledge to new situations, interpreting, solving problems	1
12(d)(ii)	Volumetric analysis	Processing information (using calculations and units)	1

2018 – Section 1

Question	Area of Course	Question Type	Grade A
1	Controlling the rate	Applying knowledge to new situations, interpreting, solving problems	
2	Controlling the rate	Processing information (using calculations and units)	
3	Controlling the rate	Applying knowledge to new situations, interpreting, solving problems	
4	Chemical energy	Processing information (using calculations and units)	1
5	Periodicity	Applying knowledge to new situations, interpreting, solving problems	
6	Chemistry of Cooking	Applying knowledge to new situations, interpreting, solving problems	
7	Oxidation of food	Applying knowledge to new situations, interpreting, solving problems	1
8	Oxidation of food	Applying knowledge to new situations, interpreting, solving problems	
9	Oxidation of food	Applying knowledge to new situations, interpreting, solving problems	
10	Proteins	Applying knowledge to new situations, interpreting, solving problems	
11	Oxidation of food	Applying knowledge to new situations, interpreting, solving problems	1
12	Getting the most from reactions	Applying knowledge to new situations, interpreting, solving problems	1
13	Getting the most from reactions	Applying knowledge to new situations, interpreting, solving problems	
14	Getting the most from reactions	Applying knowledge to new situations, interpreting, solving problems	
15	Equilibria	Applying knowledge to new situations, interpreting, solving problems	1
16	Chemical energy	Processing information (using calculations and units)	
Question	**Area of Course**	**Question Type**	**Grade A**
17	Chemical energy	Processing information (using calculations and units)	
18	Oxidising and reducing agents	Applying knowledge to new situations, interpreting, solving problems	1
19	Oxidising and reducing agents	Applying knowledge to new situations, interpreting, solving problems	
20	Equilibria	Applying knowledge to new situations, interpreting, solving problems	

2018 – Section 2

Question	Area of Course	Question Type	Grade A
1(a)(i)	Periodicity	Knowledge and understanding - making statements	
1(a)(ii)	Periodicity	Knowledge and understanding - descriptions and explanations	
1(b)	Structure and bonding	Knowledge and understanding - descriptions and explanations	1
2(a)	Periodicity	Knowledge and understanding - descriptions and explanations	
2(b)(i)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
2(b)(ii)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
2(c)(i)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
2(c)(ii)	Getting the most from reactants	Processing information (using calculations and units)	
2(d)(i)	Common chemical apparatus, general practical techniques	Planning or designing experiments	
2(d)(ii)	Controlling the rate	Knowledge and understanding - descriptions and explanations	1
3(a)	General practical techniques	Planning or designing experiments	
3(b)	General practical techniques	Planning or designing experiments	
3(c)(i)	Esters, fats and oils	Knowledge and understanding - descriptions and explanations	
3(c)(ii)	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	
3(c)(iii)	Getting the most from reactants	Processing information (using calculations and units)	
4(a)	Chemistry of cooking	Knowledge and understanding - descriptions and explanations	
4(b)	Oxidation of food	Knowledge and understanding - making statements	
4(c)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
4(d)	Oxidation of food	Knowledge and understanding - descriptions and explanations	
4(e)(i)	Esters, fats and oils	Knowledge and understanding - descriptions and explanations	1
4(e)(ii)	Chemistry of cooking	Knowledge and understanding - descriptions and explanations	
5	Esters, fats and oils, soaps, detergents and emulsions	Knowledge and understanding - descriptions and explanations	2
6(a)(i)	Esters, fats and oils	Knowledge and understanding - making statements	
Question	**Area of Course**	**Question Type**	**Grade A**
6(a)(ii)	Oxidation of food	Knowledge and understanding - descriptions and explanations	1
6(b)(i)	Skin care	Knowledge and understanding - making statements	
6(b)(ii)	Skin care	Knowledge and understanding - descriptions and explanations	
6(b)(iii)	Skin care	Knowledge and understanding - making statements	
6(c)(i)	Proteins	Knowledge and understanding - making statements	
6(c)(ii)	Proteins	Processing information (using calculations and units)	1
7(a)(i)	Fragrances	Knowledge and understanding - descriptions and explanations	

7(a)(ii)	Fragrances	Processing information (using calculations and units)	
7(b)(i)	Non-specific	Processing information (using calculations and units)	
7(b)(ii)	Esters, fats and oils	Knowledge and understanding - descriptions and explanations	
7(c)(i)	Esters, fats and oils	Knowledge and understanding - descriptions and explanations	1
7(c)(ii)	Oxidation of food	Knowledge and understanding - descriptions and explanations	1
8(a)	Chemical energy	Knowledge and understanding - descriptions and explanations	
8(b)	Chemical energy	Knowledge and understanding - descriptions and explanations	
8(c)(i)	Chemical energy	Knowledge and understanding - descriptions and explanations	
8(c)(ii)	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	
8(c)(iii)	Chemical energy	Knowledge and understanding - descriptions and explanations	1
9(a)(i)	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	
9(a)(ii)	Getting the most from reactants	Planning or designing experiments	
9(b)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
9(c)	Oxidation of food	Knowledge and understanding - descriptions and explanations	
9(d)(i)	General practical techniques	Planning or designing experiments	
9(d)(ii)	Non-specific	Processing information (using calculations and units)	
9(d)(iii)(A)	Oxidation of food	Knowledge and understanding - descriptions and explanations	1
9(d)(iii)(B)	Soaps, detergents and emulsions	Knowledge and understanding - descriptions and explanations	1
10	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	2
11(a)	General practical techniques	Planning or designing experiments	
11(b)	Oxidising or reducing agents	Knowledge and understanding - descriptions and explanations	
11(c)(i)	Chemical analysis	Knowledge and understanding - descriptions and explanations	
11(c)(ii)	Chemical analysis	Knowledge and understanding - descriptions and explanations	1
12(a)(i)	Unfamiliar	Drawing conclusions and giving explanations	
Question	**Area of Course**	**Question Type**	**Grade A**
12(a)(ii)	Unfamiliar	Applying knowledge to new situations, interpreting, solving problems	1
12(b)(i)	Getting the most from reactants	Processing information (using calculations and units)	
12(b)(ii)	Non-specific	Applying knowledge to new situations, interpreting, solving problems	1

2017 – Section 1

Question	Area of Course	Question Type	Grade A
1	Structure and bonding	Knowledge and understanding - descriptions and explanations	

2	Structure and bonding	Knowledge and understanding - descriptions and explanations	
3	Periodicity	Selecting information	
4	Structure and bonding	Knowledge and understanding - making statements	
5	Structure and bonding	Knowledge and understanding - descriptions and explanations	1
6	Getting the most from reactions	Processing information (using calculations and units)	
7	Oxidation of food	Knowledge and understanding - descriptions and explanations	
8	Esters, fats and oils	Knowledge and understanding - descriptions and explanations	1
9	Skin care	Knowledge and understanding - making statements	
10	Chemistry of cooking	Knowledge and understanding - descriptions and explanations	
11	Fragrances	Knowledge and understanding - making statements	
12	Chemical energy	Knowledge and understanding - making statements	
13	Oxidising or reducing agents	Knowledge and understanding - descriptions and explanations	
14	Getting the most from reactants	Processing information (using calculations and units)	1
15	Chemical analysis (volumetric analysis)	Applying knowledge to new situations, interpreting, solving problems	
16	Non-specific	Applying knowledge to new situations, interpreting, solving problems	1
17	Equilibria	Knowledge and understanding - making statements	
18	Chemical energy	Knowledge and understanding - descriptions and explanations	
19	Soaps, detergents and emulsions	Knowledge and understanding - descriptions and explanations	
20	Equilibria	Knowledge and understanding - descriptions and explanations	

2017 – Section 2

Question	Area of Course	Question Type	Grade A
1(a)	Periodicity	Knowledge and understanding - making statements	
1(b)(i)	Periodicity	Knowledge and understanding - descriptions and explanations	
1(b)(ii)	Periodicity	Knowledge and understanding - descriptions and explanations	
1(b)(iii)	Periodicity	Knowledge and understanding - descriptions and explanations	
1(c)	Periodicity	Knowledge and understanding - descriptions and explanations	1
2(a)(i)	Controlling the rate	Drawing conclusions and giving explanations	
2(a)(ii)	Controlling the rate	Knowledge and understanding - descriptions and explanations	
2(a)(iii)A	Equilibria	Knowledge and understanding - descriptions and explanations	
2(a)(iii)B	Equilibria	Knowledge and understanding - descriptions and explanations	
2(a)(iv)A	Controlling the rate	Knowledge and understanding - making statements	
2(a)(iv)B	Controlling the rate	Knowledge and understanding - descriptions and explanations	
2(a)(iv)C	Controlling the rate	Knowledge and understanding - making statements	
2(b)(i)	Controlling the rate	Applying knowledge to new situations, interpreting, solving problems	1
2(b)(ii)	Controlling the rate	Knowledge and understanding - descriptions and explanations	
2(b)(iii)	Controlling the rate	Knowledge and understanding - descriptions and explanations	
3	Chemical analysis	Knowledge and understanding - descriptions and explanations	2
4(a)(i)	Esters, fats and oils	Knowledge and understanding - descriptions and explanations	
4(a)(ii)	Oxidation of food	Knowledge and understanding - descriptions and explanations	1
4(b)(i)	Esters, fats and oils	Knowledge and understanding - making statements	
4(b)(ii)	Soaps, detergents and emulsions	Knowledge and understanding - making statements	
4(b)(iii)	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	1
5(a)(i)	General practical techniques	Planning or designing experiments	1
5(a)(ii)	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	
5(b)	Chemical energy	Knowledge and understanding - descriptions and explanations	
5(c)(i)	Researching chemistry	Processing information (using calculations and units)	1
5(c)(ii)	Structure and bonding	Knowledge and understanding - descriptions and explanations	1
6(a)(i)	Oxidation of food	Knowledge and understanding - descriptions and explanations	
6(a)(ii)A	Researching chemistry	Planning or designing experiments	
6(a)(ii)B	Oxidation of food	Knowledge and understanding - making statements	
6(a)(ii)C	Oxidation of food	Knowledge and understanding - making statements	
6(a)(iii)A	Oxidation of food	Knowledge and understanding - descriptions and explanations	1
Question	**Area of Course**	**Question Type**	**Grade A**
6(a)(iii)B	Oxidising or reducing agents	Knowledge and understanding - descriptions and explanations	

6(b)(i)	Chemistry of cooking	Knowledge and understanding - descriptions and explanations	
6(b)(ii)	Chemistry of cooking	Making predictions and generalisations	
6(b)(iii)	Chemistry of cooking	Drawing conclusions and giving explanations	
6(b)(iv)	Chemistry of cooking	Knowledge and understanding - making statements	
6(c)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
7(a)	Chemical analysis-volumetric	Knowledge and understanding - descriptions and explanations	
7(b)(i)	Chemical analysis-volumetric	Knowledge and understanding - making statements	
7(b)(ii)	Oxidising or reducing agents	Knowledge and understanding - descriptions and explanations	1
7(b)(iii)A	Chemical analysis	Knowledge and understanding - descriptions and explanations	
7(b)(iii)B	Chemical analysis	Knowledge and understanding - making statements	1
7(b)(iii)C	Chemical analysis-volumetric	Knowledge and understanding - descriptions and explanations	
7(b)(iii)D	Common chemical apparatus	Knowledge and understanding - making statements	
7(c)	Getting the most from reactants	Processing information (using calculations and units)	
7(d)	Non-specific	Processing information (using calculations and units)	
8	Skin care /esters fats and oils	Knowledge and understanding - descriptions and explanations	2
9(a)(i)	Soaps, detergents and emulsions	Knowledge and understanding - descriptions and explanations	
9(a)(ii)	Soaps, detergents and emulsions	Knowledge and understanding - making statements	
9(b)(i)	Oxidising or reducing agents	Knowledge and understanding - making statements	
9(b)(ii)	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	
9(c)(i)	Proteins	Knowledge and understanding - making statements	
9(c)(ii)A	Proteins	Knowledge and understanding - making statements	
9(c)(ii)B	Proteins	Knowledge and understanding - descriptions and explanations	
9(c)(iii)A	Chemistry of cooking	Knowledge and understanding - making statements	
9(c)(iii)B	Chemistry of cooking	Knowledge and understanding - descriptions and explanations	
9(d)(i)	Chemistry of cooking	Knowledge and understanding - descriptions and explanations	1
9(d)(ii)	Non-specific	Applying knowledge to new situations, interpreting, solving problems	
10(a)(i)	Chemical analysis	Processing information (using calculations and units)	
10(a)(ii)	Chemical analysis	Processing information (using calculations and units)	
10(b)	Non-specific	Processing information (using calculations and units)	
Question	**Area of Course**	**Question Type**	**Grade A**
10(c)(i)	Non-specific	Applying knowledge to new situations, interpreting, solving problems	1
10(c)(ii)	Fragrances	Knowledge and understanding - descriptions and explanations	1

2016 – Section 1

Question	Area of Course	Question Type	Grade A
1	Structure and bonding	Knowledge and understanding - descriptions and explanations	
2	Structure and bonding	Knowledge and understanding - descriptions and explanations	
3	Structure and bonding	Knowledge and understanding - descriptions and explanations	
4	Controlling the rate	Processing information (using calculations and units)	
5	Fragrances	Knowledge and understanding - descriptions and explanations	
6	Chemistry of Cooking	Knowledge and understanding - descriptions and explanations	
7	Esters, fats and oils	Knowledge and understanding - making statements	
8	Proteins	Knowledge and understanding - descriptions and explanations	
9	Soaps, detergents and emulsions	Knowledge and understanding - making statements	
10	Soaps, detergents and emulsions	Knowledge and understanding - making statements	1
11	Oxidation of food	Knowledge and understanding - descriptions and explanations	
12	Oxidation of food	Knowledge and understanding - descriptions and explanations	
13	Getting the most from reactants	Knowledge and understanding - descriptions and explanations	1
14	Chemical energy	Knowledge and understanding - descriptions and explanations	
15	Equilibria	Knowledge and understanding - making statements	
16	Chemical energy	Knowledge and understanding - descriptions and explanations	
17	Oxidising or reducing agents	Knowledge and understanding - making statements	
18	Oxidising or reducing agents	Knowledge and understanding - descriptions and explanations	1
19	Oxidising or reducing agents	Knowledge and understanding - descriptions and explanations	1
20	Chemical analysis (volumetric analysis)	Suggesting improvements to experimental procedures	1

2016 – Section 2

Question	Area of Course	Question Type	Grade A
1(a)	Controlling the rate	Knowledge and understanding - making statements	
1(b)(i)	Common chemical apparatus, general practical techniques	Planning or designing experiments	
1(b)(ii)	Non-specific	Processing information (using calculations and units)	
1(c)	Controlling the rate	Processing information (using calculations and units)	
2(a)(i)	Periodicity	Knowledge and understanding - descriptions and explanations	
2(a)(ii)	Periodicity	Knowledge and understanding - descriptions and explanations	1
2(b)(i)	Periodicity	Knowledge and understanding - descriptions and explanations	
2(b)(ii)	Periodicity	Knowledge and understanding - descriptions and explanations	1
2(c)(i)	Periodicity	Making predictions and generalisations	
2(c)(ii)	Periodicity	Drawing conclusions and giving explanations	
3(a)	Structure and bonding	Knowledge and understanding - making statements	
3(b)	Getting the most from reactions	Processing information (using calculations and units)	
3(c)	Structure and bonding	Applying knowledge to new situations, interpreting, solving problems	
4	Structure and bonding	Planning or designing experiments	2
5(a)	Esters, fats and oils	Knowledge and understanding - making statements	
5(b)(i)	Esters, fats and oils	Processing information (using calculations and units)	
5(b)(ii)	Esters, fats and oils	Applying knowledge to new situations, interpreting, solving problems	
5(c)(i)	Esters, fats and oils	Knowledge and understanding - descriptions and explanations	1
5(c)(ii)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
5(c)(iii)	Structure and bonding	Knowledge and understanding - descriptions and explanations	
6(a)	Proteins	Applying knowledge to new situations, interpreting, solving problems	
6(b)	Proteins	Applying knowledge to new situations, interpreting, solving problems	
6(c)	Proteins	Knowledge and understanding - making statements	
6(d)(i)	Chemical analysis - chromatography	Applying knowledge to new situations, interpreting, solving problems	
6(d)(ii)	Chemical analysis	Processing information (using calculations and units)	1
6(e)(i)	Proteins	Applying knowledge to new situations, interpreting, solving problems	1
6(e)(ii)	non-specific	Processing information (using calculations and units)	
7(a)	Skin care	Knowledge and understanding - descriptions and explanations	
7(b)(i)	Skin care	Knowledge and understanding - making statements	

Question	Area of Course	Question Type	Grade A
7(b)(ii)	Skin care	Knowledge and understanding - making statements	
7(b)(iii)	Oxidation of food	Knowledge and understanding - making statements	
7(b)(iv)	Oxidation of food	Knowledge and understanding - descriptions and explanations	
7(c)(i)	Esters, fats and oils	Applying knowledge to new situations, interpreting, solving problems	
7(c)(ii)	Esters, fats and oils	Suggesting improvements to experimental procedures	
7(c)(iii)	Getting the most from reactions	Processing information (using calculations and units)	
7(c)(iv)	Esters, fats and oils	Knowledge and understanding - making statements	
8(a)	Equilibria	Applying knowledge to new situations, interpreting, solving problems	
8(b)(i)	Esters, fats and oils	Drawing conclusions and giving explanations	1
8(b)(ii)	Getting the most from reactions	Knowledge and understanding - descriptions and explanations	
8(c)	Chemical energy	Processing information (using calculations and units)	
9(a)(i)	Chemical energy	Processing information (using calculations and units)	1
9(a)(ii)	Chemical energy	Knowledge and understanding - descriptions and explanations	
9(a)(iii)	Chemical energy	Processing information (using calculations and units)	
9(b)	Chemical energy	Applying knowledge to new situations, interpreting, solving problems	
10	Getting the most from reactions	Knowledge and understanding - descriptions and explanations	2
11(a)(i)	Researching chemistry- common chemical apparatus	Knowledge and understanding - making statements	
11(a)(ii)	Researching chemistry- general practical techniques	Planning or designing experiments	1
11(a)(iii)	Researching chemistry - reporting experimental work	Presenting information appropriately in a variety of forms	
11(a)(iv)A	Researching chemistry- general practical techniques	Planning or designing experiments	
11(a)(iv)B	Non-specific	Processing information (using calculations and units)	1
11(a)(v)	Non-specific	Processing information (using calculations and units)	
11(b)(i)	Chemistry of Cooking	Knowledge and understanding - making statements	
11(b)(ii)	Oxidising or reducing agents	Applying knowledge to new situations, interpreting, solving problems	1
11(b)(iii)	Chemistry of Cooking	Knowledge and understanding - making statements	
11(b)(iv)	Chemical analysis	Processing information (using calculations and units)	1
12(a)(i)	Structure and bonding	Knowledge and understanding - making statements	
12(a)(ii)	Esters, fats and oils	Drawing conclusions and giving explanations	1
12(a)(iii)	Esters, fats and oils	Making predictions and generalisations	

Question	Area of Course	Question Type	Grade A
12(b)(i)	Non-specific	Processing information (using calculations and units)	1
12(b)(ii)	Non-specific	Processing information (using calculations and units)	1

Marking reliability

Teachers and lecturers should be familiar with the general marking principles for Higher Chemistry (see Appendix) and the published marking instructions that accompany SQA past papers, as these demonstrate the required marking standard.

Centre-devised marking instructions should follow the same format and standard as those published by SQA. It is good practice to prepare the marking instructions at the same time as the assessment is constructed. Marking instructions can then be refined in light of candidate responses and should be agreed between all markers and applied consistently. Cross-marking of a sample of each markers work should occur to ensure the marking instructions have been applied accurately and consistently.

Some common marking issues include:

- inconsistent application of the marking instructions
- arithmetical errors when totalling marks
- substitution of data
- calculations with a carry forward error
- identifying where a mark has been allocated in open-ended questions

Marks should only be allocated based on the written response and not what the response infers.

Cut-off scores

The notional cut-off scores for course assessment are:

70% A grade
60% B grade
50% C grade
40% D grade

Cut-off scores should be appropriate to the instrument of assessment. They should be amended to reflect any differences between centre assessments and SQA question papers.

Such differences could include:

- an assessment being split over a number of sessions
- assessments with an insufficient number of grade A marks
- assessments that do not adequately sample the skills, knowledge and understanding of the course
- assessments that do not adequately integrate the skills, knowledge and understanding of the course

You should raise the cut-off scores above notional difficulty to reflect such differences.

It is important to note that sometimes intended grade A marks perform as relatively straightforward marks. The overall performance of the cohort should therefore be reviewed after all candidates' assessments have been marked. If the grade A marks did not perform as intended, you should consider why this might be and whether the grade cut-off score should be adjusted to reflect candidate performance.

A question that is considered as relatively straightforward may yield responses that are significantly different to the marking instructions, suggesting that the wording of the question caused confusion, or that the question was too challenging. Grade cut-off scores may need to be adjusted to reflect this.

Appendix – General marking principles for Higher Chemistry

Always apply these general principles. Use them in conjunction with the detailed marking instructions, which identify the key features required in candidates' responses.

(a) Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.

(b) If a candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your team leader.

(c) Do not award half marks.

(d) Where a candidate makes an error at an early stage in a multi-stage calculation, award marks for correct follow-on working in subsequent stages, unless the error significantly reduces the complexity of the remaining stages. Apply the same principle for questions that require several stages of non-mathematical reasoning. The exception to this rule is where the marking instructions for a numerical question assign separate 'concept marks' and an 'arithmetic mark'. In such situations, the marking instructions will give clear guidance on the assignment or partial marks.

(e) Unless a numerical question specifically requires evidence of working to be shown, award full marks for a correct final response (including units) on its own.

(f) Candidates may fully access larger mark allocations whether their responses are in continuous prose, linked statements, or a series of developed bullet points.

(g) Do not deduct marks for inaccurate or unconventional spelling or vocabulary as long as the meaning of the word(s) is conveyed. **For example**, responses that include 'distilling' for 'distillation', or 'it gets hotter' for 'the temperature rises', are acceptable.

(h) In many questions, the unit in which the answer is to be expressed is given. In these questions, the candidate does not need to state a unit in their answer; but if they do, the unit must be correct. The full mark allocation cannot be awarded if an incorrect unit is shown. In these questions, incorrect units would only be penalised once in any paper.

(i) If a correct response is followed by a wrong response, award no marks. **For example** in response to the question, 'State the colour seen when blue Fehling's solution is warmed with an aldehyde', do not award marks for the response 'red green'. However, if a correct response is followed by additional information which does not conflict with that, ignore the additional information, whether correct or not. **For example** in response to a question concerned with melting point, 'State why the tube should not be made of copper', the response 'Copper has a low melting point and is coloured grey' **would** gain marks.

(j) Award full marks for the correct response to a calculation without working. Award partial marks, as shown in the detailed marking instructions, when working is given

but the final response is incorrect. An exception is when candidates are asked to 'Find, by calculation' - do not award full marks for the correct response without working.

(k) Ignore the omission of one H atom from a full structural formula provided the bond is shown.

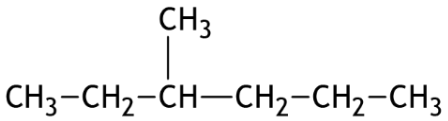
(l) Award marks for a symbol or correct formula in place of a name **unless stated otherwise in the detailed marking instructions.**

(m) When formulae of ionic compounds are given as responses, candidates only need to show ion charges if these have been specifically asked for. However, if ion charges are shown, they must be correct. If incorrect charges are shown, do not award marks.

(n) If an answer comes directly from the text of the question, do not award marks. **For example**, in response to the question, 'A student found that 0·05 mol of propane, C_3H_8 burned to give 82·4 kJ of energy. $C_3H_8(g) + 5O_2(g) = 3CO_2(g) + 4H_2O(\ell)$. Name the kind of enthalpy change that the student measured', do not award marks for 'burning' since the word 'burned' appears in the text.

(o) A guiding principle in marking is to give credit for correct elements of a response rather than to look for reasons not to give marks.

Example 1: The structure of a hydrocarbon found in petrol is shown below.



Name the hydrocarbon

- Award the full mark for '3, methyl-hexane', although the punctuation is not correct.

Example 2: A student measured the pH of four carboxylic acids to find out how their strength is related to the number of chlorine atoms in the molecule. The results are shown.

CH_3COOH	1·65
$CH_2ClCOOH$	1·27
$CHCl_2COOH$	0·90
CCl_3COOH	0·51

Describe the relationship between the number of chlorine atoms in the molecule and the strengths of the acids.

- Award the full mark for a response such as 'the more Cl_2, the stronger the acid', although not completely correct.

(p) Unless the question is clearly about a non-chemistry issue, for example costs in an industrial chemical process, do not award marks for a non-chemical response.

For example, in response to the question, 'Why does the (catalytic) converter have a honeycomb structure?', do not award a mark for 'To make it work'. This response may be correct but it is not a chemical response.

(q) Only award marks for a valid response to the question asked. Where candidates are asked to:

- **identify, name, give** or **state**, they must only name or present in brief form.
- **describe**, they must provide a statement or structure of characteristics and/or features.
- **explain**, they must relate cause and effect and/or make relationships between things clear.
- **compare**, they must demonstrate knowledge and understanding of the similarities and/or differences between things.
- **complete**, they must finish a chemical equation or fill in a table with information.
- **determine** or **calculate**, they must determine a number from given facts, figures or information.
- **draw**, they must draw a diagram or structural formula, for example 'Draw a diagram to show the part of a poly(propene) molecule formed from two propene molecules.'
- **estimate**, they must determine an approximate value for something.
- **predict**, they must suggest what may happen based on available information.
- **evaluate**, they must make a judgement based on criteria.
- **suggest**, they must apply their knowledge and understanding of chemistry to a new situation. A number of responses are acceptable: award marks for any suggestions that are supported by knowledge and understanding of chemistry.
- **use their knowledge of chemistry or aspect of chemistry to comment on**, they must apply their skills, knowledge and understanding to respond appropriately to the problem/situation presented (for example by making a statement of principle(s) involved and/or a relationship or equation, and applying these to respond to the problem/situation). Candidates gain marks for the breadth and/or depth of their conceptual understanding.
- **write**, they must complete a chemical or word equation, for example 'Write the word equation for the complete combustion of ethanol.'