Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/32**

Paper 3 Core Theory **October/November 2018**

MARK SCHEME

Maximum Mark: 80

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

PUBLISHED

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

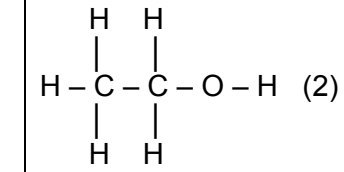
Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks
1(a)(i)	**A**	**1**
1(a)(ii)	**C**	**1**
1(a)(iii)	**B**	**1**
1(a)(iv)	**B**	**1**
1(a)(v)	**B**	**1**
1(b)	electrons in Cr^{2+}: 22 (1) neutrons in N: 8 (1) protons in N 7 **AND** Cr^{2+}: 24 (1)	**3**

Question	Answer	Marks
2(a)(i)	hydrogencarbonate / HCO_3^-	**1**
2(a)(ii)	135 (mg)	**1**
2(a)(iii)	836 (mg)	**1**
2(a)(iv)	sodium hydrogencarbonate	**1**
2(b)	sodium hydroxide: white precipitate (1) aqueous ammonia: slight white precipitate / no precipitate (1)	**2**
2(c)(i)	ring around COOH group	**1**
2(c)(ii)	$C_3H_6O_3$	**1**

Question	Answer	Marks
2(d)	small (1) monomers (1) molecular (1)	**3**

Question	Answer	Marks
3(a)(i)	One mark each for: add (organic) solvent to the mixture (1) filter off the copper (1) **AND** one mark each for any two of: • wash copper / wash residue • evaporate the filtrate (containing the selenium) / evaporate the solution of selenium / evaporate the solvent • dry (copper / selenium) in oven / dry with filter paper	**4**
3(a)(ii)	 (2) 1 mark if correct structure with OH instead of O – H	**2**
3(a)(iii)	3 (F_2)	**1**

Question	Answer	Marks
3(b)(i)	(copper + sulfuric acid) → copper sulfate + sulfur dioxide + water (2) if 2 marks not scored: 1 mark for two correct products in word equation	**2**
3(b)(ii)	sulfur dioxide / SO_2 (1) burning fossil fuels / burning named fossil fuel / volcanoes (1)	**2**
3(c)	endothermic AND heating / absorbs heat	**1**

Question	Answer	Marks
4(a)(i)	C=C (double bond)	**1**
4(a)(ii)	aqueous bromine / bromine water / bromine (1) (bromine) decolourised / goes colourless (1)	**2**
4(b)(i)	loss of oxygen / gain of electrons / decrease in oxidation number	**1**
4(b)(ii)	4 (HI) (1) 2 (I_2) (1)	**2**
4(b)(iii)	21 (%)	**1**
4(c)(i)	(volumetric) pipette	**1**
4(c)(ii)	to show when the acid has been neutralised	**1**
4(c)(iii)	red / pink (1) to blue (1)	**2**

Question	Answer	Marks
5(a)	***liquid:*** arrangement: random / not arranged / irregular (1) motion: moving (more) slowly / sliding over each other / moving randomly / restricted movement (1) ***gas:*** arrangement: random / not arranged / irregular (1) motion: moving rapidly / moving randomly / move everywhere (1)	**4**
5(b)(i)	anode correctly labelled (1) electrolyte correctly labelled (1)	**2**
5(b)(ii)	positive electrode: bromine / Br_2 negative electrode: potassium / K	**2**
5(b)(iii)	red-brown / brown fumes	**1**
5(b)(iv)	graphite is inert / graphite is unreactive / magnesium is reactive / magnesium would react with the bromine	**1**
5(c)(i)	potassium chloride (1) bromine (1)	**2**
5(c)(ii)	bromine is more reactive than iodine ORA	**1**
5(c)(iii)	cream (1) precipitate / solid (1)	**2**

Question	Answer	Marks
6(a)(i)	U (1)	**1**
6(a)(ii)	T (1)	**1**
6(a)(iii)	S (1)	**1**
6(a)(iv)	R (1)	**1**
6(b)	2nd box down ticked (1) 5th box down ticked (1)	**2**
6(c)	ammonia (is released) (1) (ammonia is) alkaline / methyl orange is yellow in alkaline conditions (1)	**2**

Question	Answer	Marks
7(a)(i)	11.5 (cm^3 / min)	**1**
7(a)(ii)	line in shape of upward curve (1) line below the curve for all temperatures (1)	**2**
7(b)(i)	decreases (rate) (1)	**1**
7(b)(ii)	increases (rate) (1)	**1**

Question	Answer	Marks
7(c)	one mark each for any two of: • malleable • ductile • conducts electricity / conducts heat • shiny / lustrous	**2**
7(d)(i)	mixture of metal with another element / mixture of metals / mixture of metal with non-metal	**1**
7(d)(ii)	any suitable use e.g. chemical plant / cutlery	**1**

Question	Answer	Marks
8(a)(i)	decrease in hardness down the Group ORA	**1**
8(a)(ii)	any value between 30 (°C) and 62 (°C) (inclusive)	**1**
8(a)(iii)	there is no definite trend / the values go down and up / no fixed pattern	**1**
8(b)(i)	lilac	**1**
8(b)(ii)	it is less dense (than water)	**1**
8(b)(iii)	bonding pair of electrons and no other electrons on the H atoms	**1**