



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2017**

Chemistry

Assessment Unit AS 2

assessing

**Module 2: Organic, Physical
and Inorganic Chemistry**

[AC122]

MONDAY 5 JUNE, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finished.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published; the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

Section A

- 1 D
- 2 A
- 3 D
- 4 B
- 5 C
- 6 B
- 7 B
- 8 B
- 9 C
- 10 B

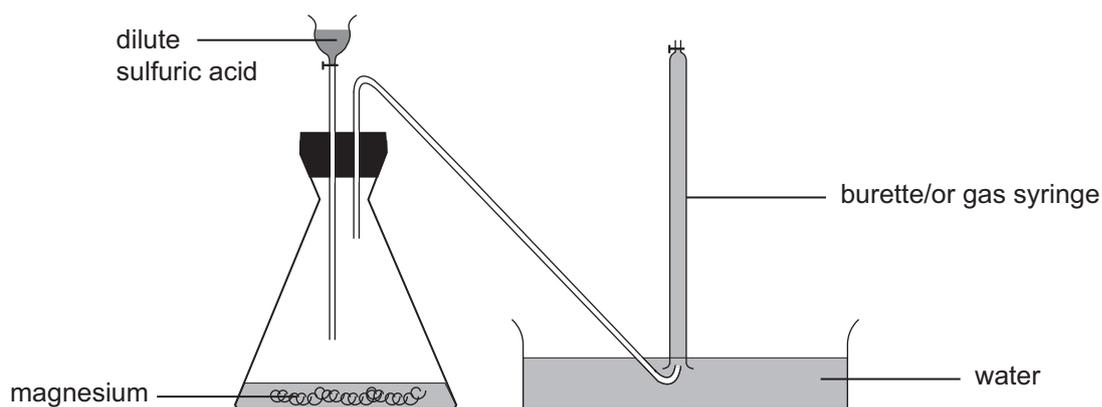
[2] for each correct answer

[20]
Section A

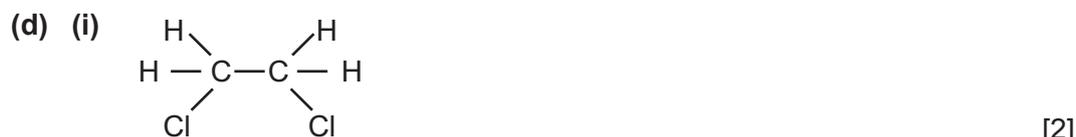
AVAILABLE MARKS	
	20
Section A	20

Section B

- | | | | AVAILABLE MARKS | |
|----|-----|--|-----------------|----|
| 11 | (a) | (i) Gas(es) [1]
Naphtha [1]
Lubricating oil [1] | [3] | 11 |
| | | (ii) (Different) boiling points | [1] | |
| | (b) | Contains carbon | [1] | |
| | (c) | Fractional [1]
Distillation [1] | [2] | |
| | (d) | Carbon dioxide [1]
Water [1] | [2] | |
| | (e) | Carbon monoxide, carbon, water | [2] | |
| 12 | (a) | (i) Fizzing/effervescence/bubbling [1]
Floats [1]
Dissolves/disappears/gets less [1]
or gets warm | [3] | |
| | | (ii) $\text{Mg} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2$ | [1] | |
| | | (iii) (Layer of) insoluble [1]
Barium sulfate (forms on the surface) [1]
Barium hydroxide (forms which) is soluble [1] | [3] | |
| | (b) | The diagram is marked by errors made if the essential features are present
Gas is allowed to escape where prepared [-1]
Gas is allowed to escape where collected [-1]
There is no means of adding the acid with the magnesium in the flask [-1]
The gas is not collected [-2] etc. | [4] | |



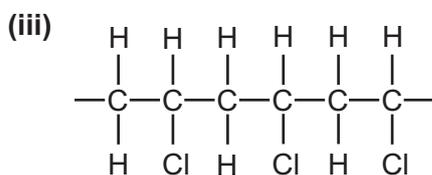
			AVAILABLE MARKS
(c)	They all produce nitrates/carbonic acid is displaced [1] Nitrates are soluble in water [1]	[2]	
(d) (i)	Use a Bunsen burner set at optimum/highest temperature [1] Heat the solids, test for carbon dioxide with limewater [1] Magnesium carbonate decomposes quickly/the first [1]	[3]	
(ii)	The size of the cation increases down the group [1] Less charge density [1] Less polarisation of the carbonate ion [1]	[3]	
(e) (i)	Sulfate ions give a white precipitate [1] Chromate ions give a yellow precipitate [1]	[2]	
(ii)	$\text{Ba}^{2+} + \text{SO}_4^{2-} \rightarrow \text{BaSO}_4$ [1] $\text{Ba}^{2+} + \text{CrO}_4^{2-} \rightarrow \text{BaCrO}_4$ [1]	[2]	23
13 (a) (i)	Catalyst	[1]	
(ii)	Five molecules produce 4 molecules/fewer molecules on the RHS [1] Faster Use a high pressure [1]	[2]	
(iii)	The concentration of oxygen would be increased and hence the yield	[1]	
(iv)	Cheaper to use air rather than oxygen	[1]	
(v)	As exothermic a low temperature should be used to increase yield [1] But the reaction would be too slow hence compromise temperature [1]	[2]	
(b)	Bonds broken = $4 \text{H}-\text{Cl} + \text{O}=\text{O} = 4 \times 432 + 498 = 1728 + 498 = +2226$ Bonds made = $4\text{O}-\text{H} + 2\text{Cl}-\text{Cl} = 4 \times 464 + 2 \times 243 = 1856 + 486 = -2342$ $\Delta H = +2226 - 2342 = -116 \text{ kJ}$	[3]	
(c) (i)	Hydrogen chloride: white fumes with stopper from bottle of concentrated ammonia solution [2] Oxygen: relights [1] a glowing splint [1]	[2]	
	Chlorine: bleaches [1] damp indicator paper [1]	[2] [6]	
(ii)	Condense the water vapour [1] Test e.g. melting point/boiling point/chemical test/take infrared spectrum and compare [1]	[2]	



[2]

(ii) Breaking down molecules/substances [1]
Using heat [1]

[2]



[3]

25

14 (a) oct-1-en-3-ol [2]

(b) C_nH_{2n} and $C_nH_{2n+1}OH/C_nH_{2n+2}O$

$C_nH_{2n}O/C_nH_{2n-1}OH$ error [-1] [2]

(c) There are no isomers [1]

Because of the $CH_2=C$ group [1] [2]

(d) (i) $CH_2=CHCH(ONa)(CH_2)_4CH_3$ [1]

$CH_2=CHCHCl(CH_2)_4CH_3$ [1]

$CH_2=CHCHCl(CH_2)_4CH_3$ [1] [3]

(ii) $CH_3CHBrCHOH(CH_2)_4CH_3$

$CH_2BrCH_2CHOH(CH_2)_4CH_3$

$CH_3CHBrCHBr(CH_2)_4CH_3$

$CH_2BrCH_2CHBr(CH_2)_4CH_3$

$CH_2=CHCHBr(CH_2)_4CH_3$ [3]

(e) (i) Acidified potassium dichromate [1]

(ii) $CH_2=CHCHOH(CH_2)_4CH_3 + [O] \rightarrow CH_2=CHCO(CH_2)_4CH_3 + H_2O$ [2]

(iii) Distil off the octenone [1]

(f) Shake [1]

With bromine water [1]

It goes colourless [1]

Quality of written communication

[3]

[2]

Section B

Total

**AVAILABLE
MARKS**

21

80

100