



GCSE MARKING SCHEME

ADDITIONAL APPLIED SCIENCE

SUMMER 2015

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2014 examination in GCSE ADDITIONAL APPLIED SCIENCE. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

GCSE ADDITIONAL APPLIED SCIENCE

SUMMER 2015 MARK SCHEME

FOUNDATION TIER: 4791/01

Question	Marking Point	Mark																				
1 (a)	<table border="1"> <thead> <tr> <th align="center" colspan="2">Metals</th> <th align="center" colspan="2">Non-metals</th> </tr> <tr> <th align="center">Element</th> <th align="center">Symbol</th> <th align="center">Element</th> <th align="center">Symbol</th> </tr> </thead> <tbody> <tr> <td align="center">Copper</td> <td align="center">Cu (1)</td> <td align="center">Phosphorus</td> <td align="center">P (1)</td> </tr> <tr> <td align="center">Aluminium (1)</td> <td align="center">Al (1)</td> <td align="center">Carbon (1)</td> <td align="center">C</td> </tr> </tbody> </table>	Metals		Non-metals		Element	Symbol	Element	Symbol	Copper	Cu (1)	Phosphorus	P (1)	Aluminium (1)	Al (1)	Carbon (1)	C	5				
Metals		Non-metals																				
Element	Symbol	Element	Symbol																			
Copper	Cu (1)	Phosphorus	P (1)																			
Aluminium (1)	Al (1)	Carbon (1)	C																			
(b) (i)	<p>12 + 32 (1) = 44 (1)</p> <p>Allow (1) only for 12 + 16</p>	2																				
(ii)	<p>44 g</p> <p>Allow ecf</p>	1																				
2 (a)	Nasal cavity Trachea Bronchus alveoli	4																				
(b)	Less oxygen in air breathed out (1) more carbon dioxide in air breathed out (1)	2																				
(c) (i)	Carbon dioxide (1) Water (1)	2																				
(ii)	Respiration	1																				
3	<p>I mark for each correct answer (shown in bold)</p> <table border="1"> <thead> <tr> <th align="center">Compound sample</th> <th align="center">Positive ion</th> <th align="center">Negative ion</th> <th align="center">Name of compound</th> </tr> </thead> <tbody> <tr> <td align="center">A</td> <td align="center">potassium</td> <td align="center">iodide</td> <td align="center">potassium iodide</td> </tr> <tr> <td align="center">B</td> <td align="center">lithium</td> <td align="center">carbonate</td> <td align="center">lithium carbonate</td> </tr> <tr> <td align="center">C</td> <td align="center">Ammonium</td> <td align="center">sulfate</td> <td align="center">Ammonium sulfate</td> </tr> <tr> <td align="center">D</td> <td align="center">sodium</td> <td align="center">chloride</td> <td align="center">Sodium chloride</td> </tr> </tbody> </table> <p>Allow: sulphate instead of sulfate Row D max of 2 marks</p>	Compound sample	Positive ion	Negative ion	Name of compound	A	potassium	iodide	potassium iodide	B	lithium	carbonate	lithium carbonate	C	Ammonium	sulfate	Ammonium sulfate	D	sodium	chloride	Sodium chloride	8
Compound sample	Positive ion	Negative ion	Name of compound																			
A	potassium	iodide	potassium iodide																			
B	lithium	carbonate	lithium carbonate																			
C	Ammonium	sulfate	Ammonium sulfate																			
D	sodium	chloride	Sodium chloride																			

Question	Marking Point	Mark
4 (a) (i)	Advantage: lower density (also accept: lighter) (1) Disadvantage: less stiff / less strong (1)	2
(ii) I	Layers / rows	1
(ii) II	can slide over each other	1
(b) (i)	Long chain molecules (1) lie side by side (1)	2
(ii)	Any three of: Polyester (compared to aluminium): <ul style="list-style-type: none"> • lower density / lighter body • higher tensile strength /stronger body • stiffer • lower melting point • brittle <i>It must be clear how the two materials compare from wording of answer</i>	3
(iii)	It is brittle	1
(iv)	mass = 1 900 x 0.4 (1) = 760 (kg) (1)	2
5 (a)	Heat the milk (to sterilise it), add the culture (bacteria), store at about 40 ⁰ C for a few hours.	3
(b) (i)	plots (2) dot to dot line(1)	3
(ii)	(No) still bacteria present after 5 days	1
(iii)	(No) still the same after 5 days (within a tolerance)	1
(c) (i)	Sterilise equipment / personal hygiene / avoid cross contamination	2
(ii)	sickness / diarrhoea	1

Question	Marking Point	Mark
6 (i)	<p>Indicative content:</p> <ul style="list-style-type: none"> • The initial velocity of the cyclist is 5 m/s. • After 1 minute, the cyclist uniformly accelerates for 30 s to a velocity of 20 m/s. • The cyclist remains at this velocity for another 2 ½ minutes (or until 4 minutes). • At 4 minutes, the cyclist decelerates non-uniformly until reaching a velocity of 5 m/s at 5 minutes. • The cyclist remains at 5 m/s from 5 to 6 minutes. <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	6QWC
(ii)	<p>Time = 2 ½ minutes (1) converted to 150 s (1)</p> <p>Distance (allow ecf) = 20 x 150 = 3 000 m (1)</p>	3
(iii)	<p>Change in velocity = 15 m/s (1)</p> <p>Time = ½ minute = 30 s (1)</p> <p>Acceleration (allow ecf) = 15/30 = 0.5 m/s² (1)</p>	3

HIGHER TIER: 4791/02

Question	Marking Point	Mark
1 (a)	Heat the milk (to sterilise it) (1) Add the culture (bacteria) (1) Store at about 40 ^o C for a few hours (1)	3
(b) (i)	Sensible scale e.g. from 4 upwards (1) Plots (2) Dot to dot line (1)	4
(ii)	(No) still bacteria present after 5 days	1
(iii)	(No) still the same after 5 days (within a tolerance)	1
(c) (i)	Any two of: Sterilise equipment Personal hygiene Avoid cross contamination	2
(ii)	Campylobacter / E. coli / salmonella	1

Question	Marking Point	Mark
2	<p>(i) Indicative content:</p> <ul style="list-style-type: none"> • The initial velocity of the cyclist is 5 m/s • After 1 minute, the cyclist uniformly accelerates for 30 s to a velocity of 20 m/s • The cyclist remains at this velocity for another 2 ½ minutes (or until 4 minutes) • At 4 minutes, the cyclist decelerates non-uniformly until reaching a velocity of 5 m/s at 5 minutes • The cyclist remains at 5 m/s from 5 to 6 minutes. <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar</p> <p>1-2 marks The candidate makes some relevant points such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit</p> <p>(ii) Time = 2 ½ minutes (1) converted to 150 s (1) Distance (allow ecf) = 20 x 150 = 3 000 m (1)</p> <p>(iii) Change in velocity = 15 m/s (1) Time = ½ minute = 30 s (1) Acceleration (allow ecf) = 15/30 = 0.5 m/s² (1)</p>	6QWC
		3
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Question	Marking Point	Mark															
3	<p>(a) (i) Advantage: lower density (accept lighter) (1) Disadvantage: less stiff / less strong (1)</p> <p>(ii) Layers of atoms can slide over each other (1) because there are no rigid bonds (1) or regular rows of atoms (1) which can slide over each other (1) <i>Only award second mark for a statement correctly linked to the first</i></p> <p>(b) (i) Long chain molecules (1) Lie side by side (1)</p> <p>(ii) Lower density so lighter body (2) higher tensile strength so stronger body (2) <i>In each case, only award second mark for a statement correctly linked to the first</i></p> <p>(iii) It is brittle</p> <p>(iv) Subs $1\ 900 = \text{mass}/0.4$ (1) $\text{mass} = 1\ 900 \times 0.4$ (1) $= 760\ \text{kg}$ (1)</p> <p>(c) More than 1 size of atoms (1) so not regular layers of atoms (1) <i>Only award second mark for a statement correctly linked to the first</i></p>	2 2 2 4 1 3 2															
4	<p>(1) for each correct point Correct answers shown in bold</p> <table border="1" data-bbox="448 1285 1294 1603"> <thead> <tr> <th>Compound sample</th> <th>Name of compound</th> <th>Chemical formula</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>potassium iodide</td> <td>KI</td> </tr> <tr> <td>B</td> <td>lithium carbonate</td> <td>Li_2CO_3</td> </tr> <tr> <td>C</td> <td>ammonium sulfate</td> <td>$(\text{NH}_4)_2\text{SO}_4$</td> </tr> <tr> <td>D</td> <td>sodium chloride</td> <td>NaCl</td> </tr> </tbody> </table>	Compound sample	Name of compound	Chemical formula	A	potassium iodide	KI	B	lithium carbonate	Li_2CO_3	C	ammonium sulfate	$(\text{NH}_4)_2\text{SO}_4$	D	sodium chloride	NaCl	8
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