



GCSE MARKING SCHEME

JANUARY 2016

**ADDITIONAL APPLIED SCIENCE
HIGHER TIER
4791/02**

INTRODUCTION

This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was 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 conference was to ensure that the marking scheme was 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' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCSE ADDITIONAL APPLIED SCIENCE HIGHER TIER

JANUARY 2016 MARK SCHEME

Question	Marking point	Marks
1 (a) (i)	LHS – cytoplasm, chloroplast RHS nucleus, vacuole	4
(ii)	I support II nucleus III control movement of substances in and out (of cell)	1
(b) (i)	chlorophyll water (1) glucose (1) + oxygen (1)	1 3
2 (a) (i)	C	1
(ii)	D	1
(iii)	B	1
(iv)	any blood vessel carrying blood to the heart	1
(b) (i)	60 (kg)	1
(ii)	No (1) because no pattern / trend (1) <i>The second point can be awarded for coherently and correctly linking the points</i>	2
(c)	Indicative content: Before training: <ul style="list-style-type: none"> • the resting heart rate is greater • maximum heart rate during exercise is greater • recovery time is longer A training programme: <ul style="list-style-type: none"> • strengthens heart muscle • making it more efficient / increased cardiac output per beat Mark Bands 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. 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.	6

Question	Marking point	Marks																									
	<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>																										
3 (a) (i)	4.8	1																									
(ii)	scales (1) all plots correct (1) line (1)	3																									
(iii)	4/4.8 (1) (alternative pairs acceptable) 0.83 N/cm (1)	2																									
(iv)	less steep line (1) through origin (1)	2																									
(b) (i)	Subs of mass 12.2 (1) calculation and subs of volume 1.5 (1) answer = 8.13 g/cm ³ (1)	3																									
(ii)	Difficulty in reading change in volume (1) because scale divisions are too large / need to be smaller (1) <i>The second point can be awarded for coherently and correctly linking the points</i>	2																									
4 (a) (i)	One mark for each line	3																									
	<table border="1"> <thead> <tr> <th>Solution 1</th> <th>Solution 2</th> <th>Example of a precipitation reaction? Yes / No</th> <th>Insoluble salt produced? Yes / No</th> <th>Name of insoluble salt, if produced</th> </tr> </thead> <tbody> <tr> <td>sodium nitrate</td> <td>barium sulfate</td> <td>no</td> <td>no</td> <td>none produced</td> </tr> <tr> <td>sodium sulfate</td> <td>lead nitrate</td> <td>yes</td> <td>yes</td> <td>lead sulfate</td> </tr> <tr> <td>potassium nitrate</td> <td>sodium carbonate</td> <td>No</td> <td>No</td> <td>none</td> </tr> <tr> <td>lead bromide</td> <td>barium hydroxide</td> <td>No</td> <td>No</td> <td>none</td> </tr> </tbody> </table>	Solution 1	Solution 2	Example of a precipitation reaction? Yes / No	Insoluble salt produced? Yes / No	Name of insoluble salt, if produced	sodium nitrate	barium sulfate	no	no	none produced	sodium sulfate	lead nitrate	yes	yes	lead sulfate	potassium nitrate	sodium carbonate	No	No	none	lead bromide	barium hydroxide	No	No	none	
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(ii)	silver nitrate (1) + sodium chloride (1) → silver chloride + sodium nitrate (1)	3																									
(b) (i)	CuSO ₄ (1) + 2(1)NaOH(1)	2																									
(ii)	I 64 + 32 (1) + 2 (1) = 98 (1) II 24.5/98 = 0.25 (1)	4																									

Question	Marking point	Marks
5 (i)	brain sends electrical signal/impulse (1) through spinal cord (1) and along nerve cells / neurons (1) to make muscle contract (1)	4
(ii)	<p>Indicative content:</p> <ul style="list-style-type: none"> • cartilage reduces friction / acts as a shock absorber / prevents bones rubbing together • synovial fluid lubricates the joint • ligament joins bone to bone, stabilising the joint • damage to or loss of cartilage due to osteoarthritis • synovial membrane becomes damaged and fluid leaks from joint • ligaments become stretched due to a strain <p>Mark Bands</p> <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>	6