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# **GCSE MARKING SCHEME**

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**SUMMER 2016**

**ADDITIONAL APPLIED SCIENCE  
UNIT 1 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**  
**4791/02 Unit 1 Higher Tier Mark Scheme Summer 2016**

Question	Marking point	Mark
1. (a) (i)	14 s	1
(ii)	Line to 30, 200 (1) Line to 43, 300 (1) Line to 55, 400 (1)  Alternative mark scheme:  All correct plots (2) Two correct plots (1) Point to point (1)	3
(iii)	fourth [1] <u>shortest time</u> / <u>steepest</u> line on graph / <u>only</u> 12 s(1) (no ecf from graph)	2
(b)	Subs $400/55$ (1) = 7.27 (m/s) (1) Accept 7.3 but not 7.2	2
(c)	All {sections / line(s)} will be steeper (1) because each time will be less (1) <i>Statements must be clearly and correctly linked to earn second mark.</i>	2
2. (a) (i)	count beats (1) in 30 s and double / 20 s and triple / 1 minute (1)	2
(ii)	345 (seen anywhere) (1) mean = 69 (1)	2
(iii)	resting pulse rate decreases (1) breathing rate decreases (1) volume / heart beat increases (1)	3
(b) (i)	drug use	1
(ii)	<b>Indicative content:</b> <ul style="list-style-type: none"> <li>• high blood pressure linked to stroke/kidney disease – reduce with exercise/less salty diet</li> <li>• smoking linked to lung disease – give up</li> <li>• high cholesterol linked to stroke / heart disease – low fat diet</li> <li>• obesity linked to diabetes/heart disease – reduce calorie intake</li> <li>• alcohol linked to liver disease – reduce intake [6]</li> </ul> <p><b>5-6 marks</b> 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>	6

Question	Marking point	Mark
	<p><b>3-4 marks</b> 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><b>1-2 marks</b> 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><b>0 marks</b> The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	
3. (a) (i)	<p>Draw a line on filter paper and place sample (of dissolved food) on line (1) Place filter paper in a solvent just below line (1)</p> <p>Alternative mark scheme: by the movement of a solvent / named solvent (1) over a medium (1)</p>	2
(ii)	<p>compounds can be separated because they have different attractions for the solvent and stationary phase (1) molecules with high attraction for stationary phase/ low attraction solvent will move slowly (1) molecules with low attraction for stationary phase/ high attraction solvent will move faster (1) <i>Statements must be coherently and correctly linked to gain 3 marks</i></p>	3
(b) (i)	forensic science (1) to separate complex mixtures (1)	2
(ii)	<u>qualitative</u> will give a {trend / observation} / <u>quantitative</u> will give numerical values	1
4. (a) (i)	be able to provide sufficient (fish oil) to supply global demand (1) conserve fish stocks (1)	2
(ii)	<p>Any <b>two</b> of:</p> <ul style="list-style-type: none"> <li>• unethical</li> <li>• create organisms that we have no control over</li> <li>• genes could spread to other organisms</li> <li>• long term effects unknown</li> <li>• could create herbicide resistant weeds</li> <li>• concern over eating GM produce</li> </ul> <p>Do <b>not</b> accept: playing God</p>	2
(b)	<p>crop production increased (1) non GM production decreased (1) GM production increased (1)</p>	3

Question	Marking point	Mark
5. (a) (i)	E.coli / salmonella / campylobacter	1
(ii)	As microorganisms/bacteria grow (1) they produce toxins (1) <i>Statements must correctly and coherently linked to earn second mark.</i>	2
(b) (i)	Heat kills microbes (1) (chemicals found in) the smoke act as preservatives (1) the food dries / less moisture for bacteria to grow (1)	3
(ii)	Refrigeration / freezing / salting / heating / drying / pickling	1
6. (a) (i)	$[-CO-C_6H_4-CO-NH-C_6H_4-NH-]_n$ formula (1)[brackets] <sub>n</sub> (1) Accept: $C_6H_4CO-NH$ (1) (backwards)	2
(ii)	C – 14 x 12 = 168 H – 10x 1 = 10 O – 2 x 16 = 32 N – 2 x 14 = 28 All/3 number of atoms correct (2) 2/1 numbers (1) Multiplying correctly by RAM (1) Correct RFM = 238 (1) allow ecf	4
(b)	Indicative content: <ul style="list-style-type: none"> <li>• Kevlar® is stronger and tougher / not brittle</li> <li>• Shorter chains of molecules</li> <li>• Chains packed closer together</li> <li>• Extra/strong bonds between chains</li> </ul> <p><b>5-6 marks</b> 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><b>3-4 marks</b> 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>	6QWC
(c)	Subs/manipulation so $1.44 \times 300$ (1) Ans = 432 (g) (1)	2