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# **GCSE MARKING SCHEME**

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**SUMMER 2018**

**GCSE  
BIOLOGY - COMPONENT 2  
C400U20-1 and C400UB0-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2018 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.

**EDUQAS GCSE BIOLOGY**  
**COMPONENT 2 - CONCEPTS IN BIOLOGY**  
**SUMMER 2018 MARK SCHEME**  
**GENERAL INSTRUCTIONS**

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (except for the extended response question).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statement.

### Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only  
ecf = error carried forward  
bod = benefit of doubt

Question				Marks available				Maths	Prac
				AO1	AO2	AO3	Total		
1	(a)	(i)	Tube x biuret (1) Tube y iodine (1)	2			2		2
		(ii)	Protein absent/negative (1) Starch blue/black colour (1)		1 1		2		2
	(b)	(i)	benedict's solution (1) heat <u>strongly</u> /boil (1) hot water can burn/scald (1)	2			3		3
		(ii)	(Red colour) indicates presence of sugar			1	1		2
		(iii)	The smoothie contains starch which may have broken down to glucose/sugar		1		1		
			<b>Question 1 total</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>9</b>	<b>0</b>	<b>9</b>

Question				Marking details	Marks available				Maths	Prac
					AO1	AO2	AO3	Total		
2	(a)	(i)		paper disc/place liquid antibiotic into well (1) Minimal opening of the lid/lid lifted at angle/work near Bunsen burner/(1) Flame forceps/use sterile pipette (1)	3			3		3
		(b)	(i)	36 -37		1		1		
		(ii)	I	C + biggest clear zone on day 1			1	1		1
			II	B largest clear area at 3 days			1	1		1
	(c)	(i)		35–40 °C Reasons –most suitable for bacterial growth/human body temperature	1 1			2		2
			(ii)		Prevents pathogens from {leaving the dish/other bacteria entering/contamination}	1			1	
				<b>Question 2 total</b>	<b>6</b>	<b>1</b>	<b>2</b>	<b>9</b>	<b>0</b>	<b>8</b>

Question			Marking details	Marks available				Maths	Prac
				AO1	AO2	AO3	Total		
3		QER							
	(a)		<p><b>Indicative content:</b></p> <ul style="list-style-type: none"> <li>• Cortex recognised as outer layer of kidney ,</li> <li>• Medulla recognised in middle region</li> <li>• Cortex darker in colour/medulla lighter colour</li> <li>• Pelvis recognised as white region</li> <li>• part <b>A</b> - ureter</li> <li>• Function of ureter to carry urine(wastes/named waste) away</li> <li>• Part <b>B</b> blood vessel ,</li> <li>• Blood vessels carry blood to and from the kidney</li> <li>• Filtering of blood in kidney</li> </ul> <p><b>5-6 marks</b> Most of the indicative content must be included. A and B must be identified for top band of mark scheme. <i>There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant to the argument.</i></p> <p><b>3-4 marks</b> Three regions within the kidney are named and positions recognised Relevant reference made to either ureter or blood vessel. <i>There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included in the response but there may be some minor errors or the inclusion of some information not relevant to the argument.</i></p> <p><b>1-2 marks</b> Reference to one/two regions of the kidney and positions recognised, <i>There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of information not relevant to the argument.</i></p> <p><b>0 marks</b> <i>No attempt made or no response worthy of credit.</i></p>	3	3		6		
	(b)		Risk of infection from fresh animal material.	1			1		
			<b>Question 3 total</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>

Question			Marking details	Marks available				Maths	Prac
				AO1	AO2	AO3	Total		
(a)		I	temperature scale		1		4	4	
		II	6 plots correct = 2marks 5 correct = 1 mark ± 1 small square		2				
		III	line quality		1				
(b)	(i)		Increase in rate of activity then decrease (1) Reference to 40° C (1)			2	2		2
	(ii)		0.27 μmol/min(2) correct answer without unit (1) incorrect answer but correct readings and method (1)		2		2	2	
	(iii)		increased kinetic energy/molecules moving faster(1) Increased collisions – (enzyme and substrate) (1)	2			2		
	(iv)		<b>Any two (x1) from:</b> {alters/denatures/destroys} enzyme (1) shape of active site altered (1) substrate cannot fit/no enzyme substrate complexes formed (1)	2			2		
			<b>Question 4 total</b>	<b>4</b>	<b>6</b>	<b>2</b>	<b>12</b>	<b>6</b>	<b>2</b>



Question			Marking details	Marks available				Maths	Prac
				AO1	AO2	AO3	Total		
5	(a)	(i)	5 ages, spread throughout the range (15-45). including 15 and 45 (1)  3 ( or more) people of each age (1)		2		2		2
		(ii)	Any three (x1) from <ul style="list-style-type: none"> <li>• place/position of hand at start (1)</li> <li>• press button <u>as soon as light is seen</u> (1)</li> <li>• Use of dominant hand (1)</li> <li>• No use of stimulants (1)</li> <li>• no distracting noise/or eq (1)</li> <li>• same background light/no light from outside/do investigation in dark room (1)</li> <li>• same number of practice attempts (1)</li> </ul>		2	1	3		3
	(b)		Reaction time increases with age/reactions slower with age (1) {Hypothesis/it/part a} supported (because reaction time increases with age) (1) {Hypothesis/it/part a} not supported as only one gender in results (1)  Hypothesis supported because reaction time increases with age = 2 marks			3	3		
			<b>Question 5 total</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>0</b>	<b>6</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6/1	(a)	(i)		Contact/aerosols/body fluids/water/insects/contaminated food	1*			1		
		(ii)		Only kill bacteria/do not kill viruses	1			1		
		(iii)		reduced {risk/chance/probability} of {catching the disease/of the disease spreading}/less likely to catch disease/ more difficult to catch the disease/ it is more difficult for the disease to spread		1		1		
		(iv)		HIV/AIDS weakens immune system/owtte		1		1		
	(b)	(i)		Mortality decreases		1		1		
		(ii)		The mortality rate had been decreasing for a long time before introduction of vaccine in the UK			1	1		
	(c)	(i)		616 400 = 2 marks If incorrect award 1 mark for sight of: 670 000 x 0.92		2		2	2	
		(ii)		<b>Any one (x1) from:</b> <ul style="list-style-type: none"> <li>• Small number in trial</li> <li>• Ref. conflict of interest/bias</li> </ul> <b>Any one (x1) from:</b> <ul style="list-style-type: none"> <li>• Increase sample size</li> <li>• Ref. reproducibility</li> </ul>			2	2		2
	(d)			<b>Any five (x1) from</b> <ol style="list-style-type: none"> <li>1. {Inject/introduce} {inactive form/dead} of {MMR/pathogen/virus}/inject antigen</li> <li>2. Antigens activate {lymphocytes/WBC}/ref to antigen recognition(1)</li> <li>3. Which multiply to form clones (1)</li> <li>4. Produce antibodies (1)</li> <li>5. That destroy infecting micro-organisms (1)</li> <li>6. Memory cells (for measles, mumps and rubella) produced (1)</li> </ol>	4	1		5		
				<b>Question 6/1 total</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>2</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			Hazard - using <u>sharp</u> scalpel (1) Accept Ref to use of cork borer Risk – cutting {skin/yourself} while cutting potato <b>and</b> Control measure – always cut {down/away} from body/onto a tile (1)	2			2		2
	(b)	(i)		-13.0 = 2 marks If incorrect award 1 mark for -13 -13.0435 -0.6/4.6 x100		2		2	2	
		(ii)		Correct plotting (1) ecf Smooth curve of best fit (1) Accept plot to plot with a ruler		2		2	2	
		(iii)		Water has moved in (1) From a region of high water concentration to a region of low water concentration/correct ref. to along water potential gradient/correct ref. to solute concentrations (1) Through semi permeable membrane (1) Osmosis (1)	2	2		4		
		(iv)		28% + <b>units</b> (1) tolerance $\pm$ 1 small square			1	1		
	(c)	(i)		Take more readings between <b>20 - 40%</b> (1)			1	1		1
		(ii)		Used a balance accurate to 2 decimal places			1	1		1
				<b>Question 2 total</b>	<b>4</b>	<b>6</b>	<b>3</b>	<b>13</b>	<b>4</b>	<b>4</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			Lock and key	1*			1		
	(b)	(i)		Lipase breaks down fat in milk (1) to fatty acid (and glycerol) (1) Reducing pH/more acidic (1)	2		1	3		1
		(ii)		{Lipase/active site/enzyme} has been {denatured/altered/destroyed}/ cannot form enzyme substrate complexes (1) Therefore no reaction/no change in pH/fats have not been broken down (1)	1		1	2		
	(c)	(i)		To allow temperature of the milk to equilibrate with water bath/OWTTE (1)			1	1		1
		(ii)		Independent variable: enzyme concentration (1) <b>Any two</b> controlled variables for <b>1 mark</b> from: volume of milk volume of lipase temperature concentration of fat in milk age of milk source of milk			2	2		2
				<b>Question 3 total</b>	<b>4</b>	<b>0</b>	<b>5</b>	<b>9</b>	<b>0</b>	<b>4</b>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			A = cortex (1) Accept capsule B = pelvis (1) C = ureter (1)	3			3		3
	(b)	(i)		Any <b>two</b> for <b>1 mark</b> from: <ul style="list-style-type: none"> <li>• less glucose</li> <li>• less urea</li> <li>• less mineral salts/ions/named mineral salts</li> <li>• less oxygen/deoxygenated</li> <li>• more carbon dioxide</li> </ul> water = neutral		1		1		
		(ii)		10% = <b>3</b> marks If incorrect award <b>2</b> marks for 2.5% (did not x 0.25) $1.25 \times 60 \times 24 = 1800$ litres/day If incorrect award <b>1</b> mark for $0.25 \times 5 = 1.25$ litre/min $5 \times 60 \times 24 = 7200$ litres/day		3		3	3	
				<b>Question 4 total</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>7</b>	<b>3</b>	<b>2</b>

Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
5	(a)	<p><b>Indicative content</b></p> <ul style="list-style-type: none"> <li>• At the start uptake of A is greater than B</li> <li>• Ref to Active transport</li> <li>• Sulphate is taken up against a concentration gradient</li> <li>• This requires energy/ATP</li> <li>• Seedling <b>A</b> is in aerobic conditions/able to carry out aerobic respiration</li> <li>• Which produces ATP/releases energy</li> <li>• Seedling <b>B</b> is in anaerobic conditions.</li> <li>• After cyanide, uptake is {at same rate in A and B/reduced in A/still increasing but at slower rate}/cyanide {reduces uptake in A/has no effect on B}</li> <li>• Ref. Sulfate up by diffusion in B/Sulfate only taken up by diffusion in A after cyanide added</li> </ul> <p><b>5-6 marks</b> Covers transport methods in both A and B in detail and effect of cyanide. <i>There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant to the argument.</i></p> <p><b>3-4 marks</b> Covers transport methods in either A or B and some attempt at effect of cyanide. <i>There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included in the response but there may be some minor errors or the inclusion of some information not relevant to the argument.</i></p>	3	3		6		

Question				Marking details	Marks available						
					AO1	AO2	AO3	Total	Maths	Prac	
				<p><b>1-2 marks</b> Covers transport methods in A or B or may give comment on effect of cyanide. <i>There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of information not relevant to the argument.</i></p> <p><b>0 marks</b> <i>No attempt made or no response worthy of credit.</i></p>							
				<b>Question 5 total</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)		% cover increases <u>over time</u>		1		1		
		(ii)		To show that it was the efforts at regenerating that was having an effect/Comparison (qual.)	1			1		1
	(b)			<b>Any three (x1) from:</b> Carbon taken in by plants during photosynthesis (1) {Converted to/stored as} biomass (1) {Plants/Biomass}{ does not decompose/remains as peat/does not decay} (1) decomposing micro-organisms unable to live in {acidic/anaerobic} conditions (1)		3		3		
	(c)			Decomposers in arable soil/decomposition can occur in arable soil (1) Ref. urease (1) convert of urea to ammonia/urea broken down to ammonia (1) Makes soil less acidic/increases pH(1) Decomposers not present in soil from Shelf Moor/decomposition cannot occur (1) ORA	3	1	1	5		5
				<b>Question 6 total</b>	<b>4</b>	<b>5</b>	<b>1</b>	<b>10</b>	<b>0</b>	<b>5</b>



## COMPONENT 2 – CONCEPTS IN BIOLOGY

### FOUNDATION TIER

#### SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1 (smoothie)	4	4	1	9	0	9
2(bacteria)	6	1	2	9	0	8
3 ( kidney )	4	3	0	7	0	0
4(enzyme)	4	6	2	12	6	2
5( reactions)	0	4	4	8	0	6
6 (ARTICLE)	6	6	3	15	2	2
<b>TOTAL</b>	<b>24</b>	<b>24</b>	<b>12</b>	<b>60</b>	<b>8(6)</b>	<b>25</b>

## HIGHER TIER

### SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	6	6	3	15	2	2
2	4	6	3	13	4	4
3	4	0	5	9	0	4
4	3	4	0	7	3	2
5	3	3	0	6	0	0
6	4	5	1	10	0	5
Target	24	24	12	60	6	9
TOTAL	24	24	12	60	9	17