



GCSE MARKING SCHEME

BIOLOGY

SUMMER 2013

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2013 examination in GCSE BIOLOGY. 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.

Science - Biology

B1

Question	Marking details	Marks Available
1 (a)	fructose;	1
(b) (i)	west;	1
(ii)	E;	1
(iii)	A;	1
Question 1 total		[4]

Question	Marking details	Marks Available
2	(a) (i) E;	1
	(ii) A or B;	1
	(iii) A, B or C;	1
	(b) (i) 3;	1
	(ii) 5;	1
	(iii) 4;	1
	(c) (i) I 16.00-20.00; Accept 16-20	1
	II 04.00-07.00; Accept 4-7	1
	(either order)	
	(ii) <u>Most/ more</u> of the hamsters; Accept 90%	2
	Reject All	
	Are {below ground/ below surface/ in their burrows/ do not come out} at { <u>night</u> / when it is <u>dark</u> };	
	<i>reverse argument</i>	
	Less hamsters; Accept only 10%	
	Are {above ground/ active} when it is {dark//at night};	
	Reject All	
	Question 2 total	[10]

Question	Marking details	Marks Available
3	(a) (i) 23;	2
	(ii) 46;	
	(b) 50%;	1
	Question 3 Total	[3]

Question	Marking details	Marks Available
4 (a)	algae/ (water) plants/ moss/ named plants; accept weeds/ algal bloom	1
(b)	bacteria; fungi; Reject germs/ microbes	2
(c)	oxygen; accept correct symbols	1
Question 4 Total		[4]

Question	Marking details	Marks Available
5	(a) (i) liver;	1
	(ii) brain;	1
	(iii) <u>harm/ hurt/ damage/ reduce growth of</u> {baby/ child/ foetus/ embryo};	1
	(b) (i) 4.5;	2
	(ii) 1.5 (ecf);	
	(c) Deter people from drinking/ cut down consumption of alcohol/ less people spending money on alcohol/ people buy less alcohol; Reject <u>stop</u> people drinking/ buying alcohol;	1
	Question 5 Total	[6]

Question	Marking details	Marks Available												
6 (a)	Kills the weeds/ plants (reject animals/ pests); Reject stop weeds growing that compete (with the crop)/ {more room/ nutrients/ light} for crop;;	2												
(b) (i)	2 4 (5) 3 1 6 ;;;; 5 correct = 4 4 correct = 3 3 correct = 2 2 correct = 1 1 correct = 0	4												
(ii)	<table border="1"> <thead> <tr> <th>Argument</th> <th>✓ or ✗</th> </tr> </thead> <tbody> <tr> <td>Increased crop yield</td> <td>given</td> </tr> <tr> <td>Less herbicide used</td> <td>given</td> </tr> <tr> <td>Reduced biodiversity</td> <td>✗</td> </tr> <tr> <td>Cheaper food</td> <td>✓</td> </tr> <tr> <td>Long term effects unknown</td> <td>✗</td> </tr> </tbody> </table>	Argument	✓ or ✗	Increased crop yield	given	Less herbicide used	given	Reduced biodiversity	✗	Cheaper food	✓	Long term effects unknown	✗	1
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Increased crop yield	given													
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Reduced biodiversity	✗													
Cheaper food	✓													
Long term effects unknown	✗													
	All 3 correct for 1 mark;													
(iii)	Any two from, <u>Cost</u> of <u>extra</u> herbicide/ farmers have to <u>buy extra</u> herbicide; Competition from (resistant)soya/ description of competition; Herbicide kills maize;	2												
Question 6 Total		[9]												

Question	Marking details	Marks Available
7/1 (a)	<u>growth</u> (response) shown by <u>plants</u> ;	1
	to a { <u>one sided/unilateral</u> } stimulus;	1
	Accept example of growth of plant towards {light <u>source</u> / <u>pull of gravity</u> / <u>source of gravity</u> } / sun;	1
(b)	(i) shoot drawn growing up from the horizontal;	2
	root shown growing down from the horizontal;	
	Must show at least slight curvature in the correct direction	
	Shoot should have leaves/ root should have an end	
	(ii) I <u>positive</u> gravitropism/ geotropism;	2
	Accept negative gravitropism/ geotropism if relates to drawing	
	Reject negative phototropism	
	II <u>positive</u> phototropism;	
	(Accept: negative gravitropism/ geotropism)	
	ANSWERS MUST RELATE TO THEIR DRAWING	
	Question 7 Total	[6]

Question	Marking details	Marks Available
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8/2 (a)	<p>Any 2 from:</p> <p>the <u>more</u> overweight the greater the chance (of early death);</p> <p>the <u>more</u> overweight a person is initially the greater the chance (of <u>early</u> death) after losing weight;</p> <p>losing weight decreases the chance (of early death);</p> <p>Reject greater chance of death (not qualified by 'early')</p>	2
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(b)	(i)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">John's lunch</th> <th style="width: 50%;">kJ</th> </tr> </thead> <tbody> <tr> <td>large portion of chips (300g)</td> <td style="text-align: center;">3195</td> </tr> <tr> <td>4 slices of bread and butter</td> <td style="text-align: center;">2080</td> </tr> <tr> <td>large fried fish 250g</td> <td style="text-align: center;">1375</td> </tr> <tr> <td>2 cups of black coffee with 4 teaspoons of sugar per cup</td> <td style="text-align: center;">1360</td> </tr> <tr> <td>200g portion of apple pie</td> <td style="text-align: center;">2400</td> </tr> <tr> <td>50 g portion of custard</td> <td style="text-align: center;">250</td> </tr> <tr> <td>Total energy content of John's lunch</td> <td style="text-align: center;">10,660</td> </tr> </tbody> </table>	John's lunch	kJ	large portion of chips (300g)	3195	4 slices of bread and butter	2080	large fried fish 250g	1375	2 cups of black coffee with 4 teaspoons of sugar per cup	1360	200g portion of apple pie	2400	50 g portion of custard	250	Total energy content of John's lunch	10,660	2
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Total energy content of John's lunch	10,660																		

Foods = 1 mark;

Total = 1 mark; (ecf)

Question	Marking details	Marks Available
(ii)	160 (kJ); Allow ECF from (b)(i) as long as candidate's answer is greater than 10 500	1
(iii)	19%	1
Question 8/2 Total		[6]

Question	Marking details	Marks Available
9/3 (a)	A <u>erector</u> muscle;	2
	B <u>sweat</u> pore;	
(b)	Any two of the following. 1 mark for response 1 mark for explanation(2x2)	4
Response	hairs flattened; NOT hairs relax/ lie down	
Explanation	{thin layer of / insulating layer of/ less} air trapped so more heat {can escape/ be lost}; NOT no air trapped	
Response	sweat (present)/ sweating/ sweat produced;	
Explanation	<u>heat</u> lost by <u>evaporation</u> / <u>heat</u> {removed from the body/ used} to <u>evaporate</u> sweat;	
Response	vasodilation/blood vessels <u>wider</u> ; NOT larger/ increase in size/ grow/ expand/ bigger	
Explanation	<u>more</u> blood near skin surface <u>more</u> heat lost; NOT blood gets nearer to skin surface	
Question 9/3 Total		

Question	Marking details	Marks Available
10/ 4	<p>Indicative content</p> <p>Carbon dioxide taken up by plants for photosynthesis. Carbon used in manufacture of carbohydrates/ sugar/ starch/ protein/ fat. Plants eaten by animals. Plants and / or animals respire and return carbon (dioxide) to air. Plants and/ or animals die. Decay/ named organisms release carbon (dioxide) to air. Reference to fossilisation due to lack of decay. Combustion/ burning of fossil fuels releases carbon (dioxide).</p> <p>5-6 marks</p> <p>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</p> <p>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</p> <p>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</p> <p>The candidate does not make any attempt or give a relevant answer worthy of credit</p>	6
	Question 10/4 Total	[6]

Question	Marking details	Marks Available
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5 (a) (i) B- 6 black and 2 white;

(ii) Allow ECF from (a) (i)

Gametes correct; Must be B 1

Must link to answer to a(i) 1

Cross correct;

Gametes	B	b
B	BB	Bb
b	Bb	bb

(b) (i) I XY both correct 1 mark 1

II XX;

Gametes correct; (ECF)

Cross correct; 1

1

Gametes	X	Y
X	XX	XY
X	XX	XY

Question 5 Total

[6]

Question	Marking details	Marks Available
6	(a) (i) DNA;	1
	(ii) Genes/ alleles;	1
	(b) (i) E;	1
	(ii) E and/ or D;	1
	(iii) A;	1
	(iv) B and C;	1
	Question 6 total	[6]

Question	Marking details	Marks Available
7 (a)	Bacteria/ microorganisms/ microbes/ decomposers use oxygen; NOT (de)nitrifying bacteria for respiration;	2
(b)	Any 4 from Bacteria/ microorganisms/ microbes/ decomposers; Change {protein/urea} to ammonia (compounds); Increase <u>and</u> then a decrease in ammonia; (decrease is) due to dilution; (Some) ammonia is changed to nitrates;	4
Question 7 total		[6]

Question	Marking details	Marks Available
8 (a)	<u>44 000</u> x 100 (working shown); 4 600 000 Answer = 1% ; correct answer = 2 marks	2
(b)	Any two from Energy used by organisms for cell {repair/ maintenance}; growth; movement; reproduction; Energy transferred to environment (lost) during respiration (as heat); excretion; Accept correctly named waste	2
Question 8 total		[4]

Question	Marking details	Marks Available												
9 (a)	Negative feedback; NOT homeostasis	1												
(b) (i)	Insulin;	1												
(b) (ii)	Glucagon; correct spelling	1												
(c)	Liver;	1												
(d) (i)	Use Benedicts; <u>Boil/ heat at 80°C or above/ heat strongly;</u> NOT heat unqualified/ warm/ hot OR Use clinistix/ urinalysis strips/ uristix/ multistix ; Dip (clinistix) into sample;	2												
(d) (ii)	<table border="1"> <thead> <tr> <th>Reagent</th> <th>Present</th> <th>Absent</th> </tr> </thead> <tbody> <tr> <td>Benedicts</td> <td>brown/ orange/ reddish brown/ brick red/ brownish red/ green; NOT red unqualified/ yellow</td> <td>blue/ light blue/ clear blue; NOT dark blue/ purple</td> </tr> <tr> <td>Clinistix/ multistix</td> <td>Dark blue/ purple/ dark purple;</td> <td>pink/ red;</td> </tr> <tr> <td>Uristix</td> <td>Brown;</td> <td>Green;</td> </tr> </tbody> </table>	Reagent	Present	Absent	Benedicts	brown/ orange/ reddish brown/ brick red/ brownish red/ green; NOT red unqualified/ yellow	blue/ light blue/ clear blue; NOT dark blue/ purple	Clinistix/ multistix	Dark blue/ purple/ dark purple;	pink/ red;	Uristix	Brown;	Green;	2
Reagent	Present	Absent												
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Clinistix/ multistix	Dark blue/ purple/ dark purple;	pink/ red;												
Uristix	Brown;	Green;												
Question 9 total		[8]												

Question	Marking details	Marks Available
10	<p>Indicative content</p> <p>A mutation in one or more genes caused variation in the rat population. One variety became resistant to poison. This was an advantage to the resistant individuals and due to natural selection/ survival of the fittest to breed, allowed the resistant gene to be passed on to the offspring of the surviving rats. Success in Henderson Island will depend on the smaller population (small island) and killing all the rats initially.</p> <p>5-6 marks</p> <p>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</p> <p>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</p> <p>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</p> <p>The candidate does not make any attempt or give a relevant answer worthy of credit</p>	
	Question 10 Total	[6]

Science - Biology

B2

Question	Marking details	Marks Available
1	(a) (i) Selling to <u>florists/ floral industry/ bouquets</u> ;	1
	(ii) Cutting too many leaves/ cutting too often/ removing too many leaves; NOT cutting down	1
	(b) (Decrease) loss of (animal) <u>species/ species</u> becoming extinct/ less or fewer <u>species</u> ; Reject animals haven't got enough food/ numbers decreasing/ species will die/ not enough food to feed all the species Reject type instead of species	1
	(c) (Palm) tree slow growing/ long time needed to produce (enough) leaves (to sell)/ <u>only</u> two leaves are produced each year; NOT two leaves are produced each year	1
	(d) Employment/ local economy/ lose source of money/ no crops for farmers/ can't sell them to make money/ ORA;	1
	Question 1 total	[5]

Question	Marking details	Marks Available
2 (a)	(i) protein — glucose starch — fatty acids and glycerol fats — amino acids 2/3 correct lines;; (1 correct = 1 mark)	2
	(ii) For absorption/ pass through cell/ for getting into blood/ for use by cells/ pass through cell membrane;	1
	(iii) {for /to release / to get} source of energy; NOT produce energy/ make energy	1
(b)	(i) I F } II G; }	1
	(ii) C and E;	1
(c)	Benedicts (reagent); Protein;	2
Question 2 total		[8]

Question	Marking details	Marks Available
3	(a) (i) Suitable scale properly labelled;	1
	(ii) Correct plots; $\frac{1}{2}$ small square tolerance 1 error = 1 mark 2 errors = 0 No extrapolation	2
	(iii) Good quality line through the centre of the points with ruler;	1
	(b) (i) <u>Rises</u> then <u>falls/ goes up</u> and then <u>goes down/</u> goes to maximum and then drops;	1
	(ii) Correct readings from graph shown in working; Ideally (51 – (Any reading between 23 and 24)) Consequent correct answer; (27/ 27.5/ 28)	1
	Accept ecf <i>If no working shown accept correct answer for 2 marks if consistent with graph</i>	1
	(c) (i) 1 (cm ³) and 5 (cm ³);	1
	Fair test/ comparison;	1
	(ii) (Boiled) enzyme – <u>denatured/ destroyed</u> ; NOT ‘killed’	1
	(d) Fat;	1
Question 3 Total		[11]

Question	Marking details	Marks Available
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4	(a) A <u>Cytoplasm</u> ;	2
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B Cell membrane;

(b)	(i)	Part of algal cell	Function	3
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Part of algal cell	Function
nucleus	<u>Controls</u> cells (activities)/ <u>holds</u> or <u>contains</u> {chromosomes/ DNA/ genes/ genetic information} ;
Chloroplast;	photosynthesis
Cell wall	Shape/ support/ <u>rigid</u> structure/ stops cell expansion; NOT protection/ structure unqualified/ keeps it strong/ gives stability

(ii)	I chloroplast/ cell wall;	2
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II nucleus/ chloroplast;

Question 4 Total	[7]
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Question	Marking details	Marks Available
5 (a)	B;	1
(b)	Phosphate and sugar; (either order) Bases; Helix;	3
(c)	Code (for amino acids); NOT 'code for life'	1
	Question 5 Total	[5]

Question	Marking details	Marks Available
6/1 (a)	(Obama) believes that embryonic stem cell research will lead to the {treatment/ cure} of many diseases/ treat {damaged tissue/ or correct example}. (OWTTE);	1
	(Gingrich) – reference to the ethical issues involved eg destruction of {embryos/ foetus/ <u>unborn</u> children}/ life is lost/ destroying (potential human) life; NOT - playing God	1
(b)	(i) <u>stem</u> cells;	1
	(ii) avoids ethical issues of {using/killing} {unborn children/ embryos/ foetus}/ cells more likely to be accepted by the body/less likelihood of rejection; NOT less chance of transfer of disease/ nothing is killed/ less controversial unqualified	1
Question 6/1 Total		[4]

Question	Marking details	Marks Available
7/2 (a)	(i) Bronchiole;	1
	(ii) carbon dioxide/CO ₂ (not CO ² /Co ₂ /CO2 etc);	1
(b)	dissolves in {moist/ water} lining (of alveolus)(not dissolves in water vapour)/ passes in solution; diffuses (no ref. to diffusion gradient required); diffuses in solution = 2 marks	2

(c)	<table border="1"> <thead> <tr> <th>Gas</th> <th>Inspired air (%)</th> <th>Expired air (%)</th> </tr> </thead> <tbody> <tr> <td>Oxygen</td> <td>21</td> <td>16;</td> </tr> <tr> <td>Carbon dioxide</td> <td>0.04;</td> <td>4</td> </tr> <tr> <td>Nitrogen</td> <td>79</td> <td>79</td> </tr> <tr> <td>Water vapour</td> <td>varies</td> <td>1</td> </tr> </tbody> </table>	Gas	Inspired air (%)	Expired air (%)	Oxygen	21	16;	Carbon dioxide	0.04;	4	Nitrogen	79	79	Water vapour	varies	1	2
Gas	Inspired air (%)	Expired air (%)															
Oxygen	21	16;															
Carbon dioxide	0.04;	4															
Nitrogen	79	79															
Water vapour	varies	1															

Question 7/2 Total

[6]

Question	Marking details	Marks Available
8/3 (a)	<u>carbon dioxide/CO₂</u> (not CO ² or Co ₂ etc) required for <u>photosynthesis/starch manufacture</u> ;	1
(b)	(i) {Boil/ heat} in {alcohol/methanol/ethanol}; Boiling water = neutral	1
	(ii) Iodine (solution);	1
	(iii) no CO ₂ / CO ₂ absorbed by sodium hydroxide; no photosynthesis; no starch produced;	3
(c)	Control/ to make a comparison;	1
(d)	because you wouldn't know whether it was the lack of light or lack of carbon dioxide which prevented photosynthesis/starch production; Answer must refer to <u>both</u> carbon dioxide and light limiting photosynthesis	1
Question 8/3 Total		[8]

Question	Marking details	Marks Available
9/4	<p>Indicative content</p> <p>The balloons represent lungs. The rubber sheet represents diaphragm. When rubber sheet is pulled down, the volume of air-tight space around balloons increases and pressure decreases/ drops/ goes down. The balloons inflate/ expand/ blow up as air is drawn in.</p> <p>5-6 marks</p> <p>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</p> <p>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</p> <p>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</p> <p>The candidate does not make any attempt or give a relevant answer worthy of credit</p> <p>Question 9/4 Total</p>	6
		[6]

Question	Marking details	Marks Available
5	(a) (i) arrow pointing to liver;	1
	(ii) arrow pointing to gall bladder; (ends of arrows must touch or go into each organ)	1
	(b) (i) speeds up (digestion)/ allows more to be digested;	1
	(ii) Break down <u>large</u> droplets of oil (into small droplets)/ emulsifies; NOT reference to molecules NOT reference to digestion increase <u>surface area</u> ; Must be clear that it is in reference to oil droplets, especially if first mark is not given for lipase to work/for enzyme action; (cannot be given alone)	3
Question 5 Total		[6]

Question	Marking details	Marks Available
6 (a)	<p>Mean catch/ mass caught increased;</p> <p>{Number/ percentage} of {<u>young</u> fish/ two year old fish} caught increased/ {number/ percentage} of {older fish/ 4-9 year old fish} caught decreased;</p>	2
(b)	<p>Larger mesh size means {<u>smaller/ younger</u>} fish are not {caught/escape}/ smaller fish thrown back;</p> <p>young fish survive to {grow/ reach breeding age}/ young fish grow to 3-4 years of age;</p> <p>So would {breed/ reproduce};</p> <p>(third marking point cannot be given alone)</p>	3
(c)	<p>{Reduce/ limit} the {quota/ size of catch/ mass of fish}/</p> <p>Restrict {days/ time} fishing boats can be used/ reduce {surface area/ size} of net/ reduce length of fishing season/ introduce no fishing;</p>	1
(d)	<p>Any two from</p> <p>Reference to less employment;</p> <p>Less fish sold/ reference to money;</p> <p>reduction of other species because cod is a predator/ cod eat other commercially important species;</p> <p>cost of buying new nets or equipment;</p>	2
Question 6 total		[8]

Question	Marking details	Marks Available
7 (a)	<p>Osmosis;</p> <p>Movement (of water) {from where it is in high concentration to low concentration/ down a concentration gradient} <u>into</u> the micro-organism;</p> <p>Via a semi permeable membrane;</p>	3
(b) (i)	Mould(s)/ moulds (fungi);	1
(b) (ii)	<p>Removes water (from food)/ causes water to pass out (of food);</p> <p>NOT salt absorbs water from fish</p> <p>Until water activity is too low for micro-organisms (or named micro-organism) to survive/ water activity is less therefore no micro-organisms can survive;</p>	2
(c)	<p>Bacteria by division/ dividing into two/ dividing/ splitting/ fission;</p> <p>NOT mitosis</p> <p>Yeast by budding;</p>	2
Question 7 total		[8]

Question	Marking details	Marks Available
8	(a) (i) S;	1
	(ii) Because of sugar stored in the yeast;	1
	(iii) Sugar was used up/ no sugar left/ alcohol poisoned (killed) yeast;	1
	(iv) To show any gas (carbon dioxide) production was caused by yeast/ eliminate oxygen/ prevent aerobic respiration/ to be able to measure from {the same starting point/ zero}; NOT so no gas present	1
	(b) (i) Oxygen debt;	1
	(ii) Lactic acid;	1
	(iii) Would be reduced;	1
	(iv) Aerobic;	1
	Question 8 total	[8]

Question	Marking details	Marks Available
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9	Indicative content	
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Two chains of alternating sugar and phosphate molecules connected by bases. The chains are twisted to form a double helix. There are 4 bases: adenine, thymine, cytosine and guanine. Base pairing occurs between A and T; C and G. Triplet codes determine types of amino acids. The order of amino acids will determine the particular protein produced.

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.

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.

0 marks

The candidate does not make any attempt or give a relevant answer worthy of credit.

Question 9 Total

[6]

GCSE Science - Biology

B3

Question	Marking details	Marks Available								
1	<p>(a) (i)</p> <table border="0"> <thead> <tr> <th align="left">Scientific term</th> <th align="left">Description</th> </tr> </thead> <tbody> <tr> <td>ureter</td> <td>fluid leaving the kidney</td> </tr> <tr> <td>urethra</td> <td>tube carrying waste solution out of the body</td> </tr> <tr> <td>urine</td> <td>tube carrying waste solution to the bladder</td> </tr> </tbody> </table> <p>2 (3) correct lines;; 1 correct = 1 mark, 2 correct = 2 marks</p>	Scientific term	Description	ureter	fluid leaving the kidney	urethra	tube carrying waste solution out of the body	urine	tube carrying waste solution to the bladder	2
Scientific term	Description									
ureter	fluid leaving the kidney									
urethra	tube carrying waste solution out of the body									
urine	tube carrying waste solution to the bladder									
	(ii) Excretion;	1								
(b)	(i) Ref to same tissue types/ blood types/ family {donor/ member} relative/ same tissue; NOT kidney that is similar	1								
	(ii) (Immune suppressant) drugs/ OWTTE; NOT drugs unqualified/ anti suppressant	1								
(c)	(i) Dialysis;	1								
	(ii) Regular {hospitalisation/treatment} / diet restrictions/ temporary/ every time they have {dialysis/ treatment} several times a week/ not a cure;	1								
	Question 1 total	[7]								

Question	Marking details	Marks Available
2	(a) (i) Cholera + 8 years;	1
	(ii) I 5 000; II (<i>E coli</i>) (very) common in humans/ causes serious {illness/ death};	2
	(b) (i) Resistant/ resistance; NOT immune	1
	(ii) Over prescription/ overuse/ giving too many antibiotics/ doctors transferring from patient to patient;	1
	(c) (Antibiotics) do not kill viruses/ only kill bacteria/ to kill an antiviral drug; Accept destroy for kill NOT do not effect/ do not work on bacteria	1
	Question 2 total	[6]

Question	Marking details	Marks Available
3	(a) (i) (seen to be) red (hot)/ glows red; NOT hot unqualified/ orange/ white	1
	(ii) (Sterilisation) kills all bacteria/ no bacteria in agar; NOT stops other bacteria getting in	1
	(iii) Count colonies (in D);	1
	(b) (i) 7; 2100; (ecf)	2
	(ii) I UHT II Traditional pasteurised	1
	(iii) Raw;	1
	(iv) Prevent bacterial growth in pasteurised/ UHT contains no bacteria; must refer to one or other of the milks	1
	Question 3 Total	[8]

Question	Marking details	Marks Available
4 (a)	Cuticle; Xylem; Stoma(ta);	3
(b) (i)	Guard (cells);	1
(b) (ii)	Open and close/ change pore size/ control how much water passes out;	1
Question 4 Total		[5]

Question	Marking details	Marks Available
5 (a)	Retina; <u>Optic</u> nerve;	2
(b) (i)	I suitable scale; 0 at origin, linear scale	1
	II all plots correct; $\frac{1}{2}$ small square tolerance 1 error = 1 mark, 2 errors = 0 marks Extrapolation (treat as plotting error – 1)	2
	III line quality; Must use a ruler through centre of plots	1
	(ii) I (level then steady) decrease/ gets smaller;	1
	II 5.9 (from graph); allow ecf from graph	1
(c) (i)	Reflex;	1
	(ii) Protective/ protection/ prevents damage/ prevent hurting the body;	1
	Question 5 Total	[10]

Question	Marking details	Marks Available
6/1 (a)	Phloem;	1
(b)	(i) 100/ 100.5; Litres/l/dm ³ ; Allow 100 000/ 100 500/ 1 x 10 ⁵ ; cm ³ / ml; Unit mark can only be given if value mark given	2
	(ii) any two from; same <ul style="list-style-type: none"> • volumes {water/ Topgrow} • light intensity/duration • temperature NOT heat • length of growing time • harvest time • {variety/ type} of tomato • type of soil • pH • height/ mass/age/ stage of growth of plant NOT size NOT 'amount'/ same {place/ environment}/ CO ₂ / 'level'	2
	(iii) I 80;	1
	II {lower /smaller} mean mass/{smaller/ lighter} tomatoes;	1
(c)	any two from; phosphate; NOT phosphorus potassium; magnesium; calcium; iron; named trace element	2
Question 6/1 Total		[9]

Question	Marking details	Marks Available
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7/2 (a) (i) 4

name of cell	function
given	carry oxygen;
lymphocyte; NOT white blood cell	given
given	<ul style="list-style-type: none"> • Ingest/ take in/ digest/ engulf; NOT eat/ destroy • bacteria/microorganisms/ pathogen/ microbes; NOT disease
given	(blood) clotting;

(ii) no nucleus/thin in centre/ (bi)concave; NOT doughnut 2

more light passes through (centre);

accept less stain

NOT less haemoglobin in the middle

Question 7/2 Total **[6]**

Question	Marking details	Marks Available
8/3	<p>Any 3 from:</p> <ul style="list-style-type: none"> <li>• Less space required (for a given mass of product); <li>• The product is more predictable; <li>• The product is more reliable; <li>• it is made under controlled conditions (cf farming); <li>• It uses waste from other processes; <li>• It produces less waste/methane; <li>• Not {weather/ climate} dependent; <li>• Continuous production/ produced on demand; <li>• Disease free; <p>Responses must refer to production, not consumption, eg.</p> <p>Suitable for vegetarians</p> <p>NOT quick/ cheap</p>	3
	Question 8/3 Total	[3]

Question	Marking details	Marks Available
9/4	<p>Indicative content</p> <p>The muscle of the right ventricle contracts and pumps blood through the valves of the pulmonary artery into the lungs. Blood then leaves the lungs, passing into the pulmonary vein, re-entering the heart in the left atrium.</p> <p>5-6 marks</p> <p>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</p> <p>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</p> <p>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</p> <p>The candidate does not make any attempt or give a relevant answer worthy of credit</p> <p>Question 9/4 Total</p>	6
		[6]

Question	Marking details	Marks Available
5 (a)	<p>Conclusion 1:</p> <p>No bacteria next to [Penicillium/fungus]/ clear area {by/ around} fungus/ bacteria only grow around edges;</p> <p>Conclusion 2:</p> <p>Effect decreases with distance from source/ effect decreases towards the edges/ clear area is circular;</p>	2
(b) (i)	antibiotic;	1
(b) (ii)	<p>Overuse/ Over prescription/ giving too many antibiotics;</p> <p>become resistant;</p> <p>NOT immune/ bacteria adapt (unqualified)</p>	2
(c)	<p>any sensible aseptic method;</p> <ul style="list-style-type: none"> • wash hands (a lot/regularly.....) • use of sterilising fluids/cloths • single use instruments/materials • use gloves • antibacterial gels • clean hospitals thoroughly • description of nurses uniform remaining in hospital <p>NOT aseptic techniques unqualified</p>	1
Question 5 Total		[6]

Question	Marking details	Marks Available
6 (a)	Correct position of label;	1
(b)	(i) Light;	1
	(ii) Retina;	1
	(iii) Iris (muscle); NOT ciliary muscle	1
(c)	Speed/ fast / rapid/ quick/ owtte; Protection/ owtte; Automatic/ owtte;	3
	Question 6 total	[7]

Question	Marking details	Marks Available
7 (a)	To keep the volumes the same/ so volume of 1cm^3 cubes is the same as the 8cm^3 cube;	1
(b) (i)	Osmosis;	1
(b) (ii)	Water passed in; From where it was in high concentration to low concentration/ down a gradient; Via a semi/ selectively/ partially permeable membrane;	3
(b) (iii)	{% increase in mass was faster/ more water was taken in} in cubes of side 1cm; Because there is a greater surface area; Root hairs increase surface area/ have a large surface area;	3
(c)	Active transport;	1
Question 7 total		[9]

Question	Marking details	Marks Available
8	(a) (i) 0-1 years;	1
	(ii) memory cells; antigens; trigger {white blood cells/ lymphocytes}; to form clones/ reproduce/ multiply / undergo mitosis; {to increase production of/ more} antibodies/ produce antibodies more quickly;	5
	(b) (i) (Edward) Jenner (correct spelling);	1
	(ii) Flu virus mutates rapidly/ antigens keep changing/ protein coat keeps changing; NOT evolve	1
	Question 8 total	[8]

Question	Marking details	Marks Available
9	<p>Indicative content</p> <p>The brain monitors whether there is too much water in the blood, and so little ADH is released. Dilute urine is excreted because the kidney tubules do not absorb much water to pass it back to the blood. If there is too little water in the blood, then more ADH is released causing concentrated urine to be excreted because the kidney tubules absorb a lot of water and pass it into the blood.</p> <p>5-6 marks</p> <p>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</p> <p>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</p> <p>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</p> <p>The candidate does not make any attempt or give a relevant answer worthy of credit</p> <p>Question 9 Total</p>	6
		[6]



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