



GCSE MARKING SCHEME

SCIENCE-BIOLOGY

SUMMER 2014

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2014 examination in GCSE Science-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.

	Page
B1	1
B2	18
B3	32

GCSE SCIENCE - BIOLOGY

B1

MARK SCHEME - SUMMER 2014

Question	Marking details	Marks Available
1 (a)	No {backbone/ vertebral column/ spinal column/ vertebrae}; NOT spinal cord/ bone	1
(b)	ANY ORDER B C D F; all four correct = 3 three correct = 2 two correct = 1	3
	Question 1 total	[4]

Question	Marking details	Marks Available
2 (a)	Sun/ solar; NOT light/ sunlight	1
(b)	<u>Energy:</u>	1
(c) (i)	20; Correct answer = 2 marks If incorrect answer allow one mark for $(500/2500) \times 100$	2
(ii)	<u>Respiration/ respiring/ respire;</u>	1
Question 2 Total		[5]

Question	Marking details	Marks Available
3 (a)	2.5;	1
(b)	0.25;	1
(c)	Any three from: light/ sunlight; NOT sun water; NOT moisture/ rain nutrients/ minerals/ salts/ named mineral; NOT food/ salt space; NOT room/ area carbon dioxide/ CO ₂ ;	3
(d)	(A and B are) <u>different</u> {types/sorts/species/genes/DNA}/ genetically different/genetic variation/ there has been a mutation; NOT different chromosomes	1
Question 3 Total		[6]

Question	Marking details	Marks Available
4	(a) (i) Soldiers whose wounds had maggots were <u>more</u> likely to survive (than soldiers who did not have maggots)/ ORA; (comparison is needed)	1
	(ii) Maggots ate bacteria (and dead flesh around the wound);	1
	(iii) Make his findings known widely/ allow reproducibility/ others to test/ to confirm findings; NOT to help more soldiers;	1
	(b) <u>Fewer</u> side effects/ drug toxicity/ bacterial resistance/ maggots are more widely available (in some parts of the world)/ some people are allergic to antibiotics; NOT some people react to antibiotics (unqualified)/ easier (unqualified)/ no side effects/ safer/ act quicker	1
	Question 4 Total	[4]

Question	Marking details	Marks Available
5 (a)	Nucleus; Gene; Protein;	3
(b) (i)	I 8; II Kangaroo; (8 is/ gametes have) {half the body cell number/ half the diploid number}/ 8 is the haploid number/ {reference to fertilisation restoring the body cell chromosome number/OWTTE}; NOT half the number of chromosome 2 nd mark only accessed if 1 st mark credited	1 2
(ii)	36;	1
Question 5 total		[7]

Question	Marking details	Marks Available
6 (a)	(2) 3 4 1 5; one mark for each number correctly positioned	4
(b)	Become extinct/ die out/ wiped out; NOT die (unqualified)/ become endangered	1
Question 6 Total		[5]

Question	Marking details	Marks Available
7 (a)	<p>1. (Playing) music {increases/slows} reaction time/ slows reactions</p> <p><i>OR Reverse answer</i></p> <p>Not playing music decreases reaction time/ makes reactions faster/ speeds up reaction time;</p> <p>NOT worse/better/improved reaction time</p> <p>2. With music, reaction times are variable/ reaction time decreases with {trial number/ practice}</p> <p><i>OR Reverse answer</i></p> <p>Without music reaction time is constant/ steady/ the same;</p> <p>NOT the longer Bob listens to music the quicker his reaction time</p>	max 2
(b)	(i) Eye;	1
	(ii) Impulses/ <u>electrical</u> signals; Along neurones/nerve/ nerve cells;	2
	Question 7 total	[5]

Question	Marking details	Marks Available
8/1 (a)	(i) Pike	1
	(ii) Pyramid correctly drawn (accept triangle) with correct labels and biomasses with units = 2 marks Pyramid correctly drawn with names of organisms on own without masses = 1 mark Pyramid correctly drawn with biomasses on own with units without named organisms = 1 mark Incorrect order or level missing = 0 marks	2
	<p style="text-align: center;"> Pike 250 kg Minnows 500 kg Beetles 800 kg Snails 4500 kg Aquatic Plants 45000 kg </p>	
	(iii) Tier above the pike;	1
(b)	{Single/one} {plant/ tree / named plant/ producer}; NOT aquatic plant On which {many organisms/ named organisms} {feed/ live off};	2
	Question 8/1 total	[6]

Question	Marking details	Marks Available
9/2 (a)	(i) The cows are <u>genetically</u> different/have different <u>genes</u> / show <u>genetic</u> variation/ different ages/ variation in the milk producing genes; NOT different genetics/ sizes/ inherited it from their parents/ mutation	1
	(ii) River field cows' milk production is higher/ ORA; there are <u>environmental</u> differences/ named environmental difference e.g. temperature/soil/nutrients/water content/ {richer/better <u>quality</u> } grass (must be comparative); 2 nd mark only awarded if 1 st is credited	2
	(iii) Sperm (are used)/ two parents/ bull and cow;	1
(b)	Holstein; it has the { <u>lowest/least</u> } fat content/ lower fat than the other cows; 2 nd mark point only accessed if first correct sugar=neutral	2
Question 9/2 Total		[6]

Question	Marking details	Marks Available
10/3	(a) <u>Erector muscle</u> ;	1
	(b) <ol style="list-style-type: none"> 1. Hairs {erect/raised/ stand up/ stick up/ are lifted/ pulled up/ straight up/ up}; 2. Trap <u>thicker</u> layer of air/ more air trapped; NOT trap layer of warm air (can be neutral) 3. Which is {an insulator/ poor conductor} / which lets less heat pass out/ which insulates/ harder for heat to escape; NOT no heat passes out <p>3rd mark only awarded if 2nd awarded</p> <p>ACCEPT REVERSE ARGUMENT</p>	3
	(c) Any two from: <ol style="list-style-type: none"> 1. Vasoconstriction/ {capillaries/ blood vessels} {narrow/ constrict/ thinner}/ diameter gets smaller; NOT contract/ get smaller/ blood vessels moving up and/or down 2. shivering; {reduced/ no} sweating/ less sweat {produced/ secreted}; 	2
Question10/3 Total		[6]

Question	Marking details	Marks Available
11/4	<p><i>Indicative content:</i></p> <p>All plants/seedlings/flowers are growing vertically straight up.</p> <p>{Place plants on a window sill/ in a (blacked out) box with a hole in one side/ any method of one sided illumination}.</p> <p>Leave plants for specified length of time.</p> <p>Plants show growth towards light/ tips 'bend' towards light. NOT move</p> <p>Reference to involvement of hormone e.g. hormone cause shoots to bend.</p> <p>Reference to control by eliminating the effect of one sided light. This should be uniform illumination. NOT darkness</p> <p>Shoots/tips don't bend towards light.</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 11/4 Total</p>	6
		[6]

Question	Marking details	Marks Available
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5	(a)	All correct 1 mark			1
		Mouse 1	BB	- black	
		Mouse 2	Bb	- black	
		Mouse 3	bB	- black	
		Mouse 4	bb	- red	

(b)	(i)	12;		1
	(ii)	All correct no errors		1

Gametes	B	B
b	Bb	Bb
b	Bb	Bb

(c)	(i)	25;		1
	(ii)	All correct no errors		1

Gametes	B	b
b	Bb	bb
b	Bb	bb

(d)	Fertilization is random/ reference to death of embryos;	1
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Question 5 Total	[6]
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Question	Marking details	Marks Available
6 (a)	(88/88 000) x 100; 0.1%; Correct answer = 2 marks	2
(b)	Accumulation of pesticides/ bioaccumulation/ increase in concentration of pesticide; Can reduce fertility/ makes them infertile/ reduce reproductive rate; NOT kills fish before they can reproduce/ less eggs fertilised 2 nd mark only awarded if 1 st awarded	2
Question 6 total		[4]

Question	Marking details	Marks Available
7 (a)	Hormone = insulin in both boxes ;	2
	Organ = pancreas;	1
	Increase = glucose;	1
	Decrease = glucose;	1
(b)	Any two from	2
	Chemical messengers;	
	Carried in blood;	
	Controls {body/a} {function/process};	
	(Insulin) decreases glucose in the blood;	
	Hormones produced by {pancreas/ glands};	
	Question 7 total	[7]

Question	Marking details	Marks Available
8	(a) (i) Nn;	1
	(ii) Nn;	1
	(b) 50(%)	1
	(c) (i) {Genetic/ DNA} {profile/ profiling}; NOT genetic fingerprinting	1
	(ii) DNA {has coded information/ codes for protein}; Baby's DNA is different to Mike's/ In the {DNA profiles/ genetic analysis} above, the baby {does not have any (base) A/ has one less G};	2
	(d) Family tree only shows the { <u>chance/probability</u> } of having CF; {Profile/ analysis/it} shows the (presence of) {alleles/mutation/gene}; NOT the genotype	2
Question 8 Total		[8]

Question	Marking details	Marks Available
9 (a)	(i) <u>More</u> {rainfall/ precipitation} therefore <u>more</u> {slurry/nitrates/manure} could be washed into water;	1
	(ii) <u>{More/ faster}</u> absorption of nitrates (as plants are growing); NOT Less rainfall in spring	1
(b)	{Herbicide/ pest/ fungus/ drought/ low temperature/ disease} resistance/ increase rate of photosynthesis/ any correct point; NOT pesticide resistance/ immune to herbicides/ increased yield	1
(c)	Protein converted to ammonia/ Ammonia is converted to nitrate; By decomposers/ bacteria/ fungi; If named, bacteria must be correct. e.g. Nitrifying bacteria change protein to ammonia = 1 mark	2
Question 9 Total		[5]

Question	Marking details	Marks Available
10	<p>Indicative content</p> <p>A gene mutates. This resulted in variation. The variation reduced water loss. This {was an advantage/ had survival value} (in the desert.) Resulted in natural selection/ survival of the fittest to breed (Advantageous altered) gene was passed on.</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> <p>Question 10 Total</p>	6
Question 10 Total		[6]

GCSE SCIENCE - BIOLOGY

B2

MARK SCHEME - SUMMER 2014

Question	Marking details	Marks Available
1	(a) (i) Any two for one mark Disease; Pests/fungus/mould; Climate change; <i>NOT pod rot</i>	1
	(ii) <u>Insufficient/ not enough</u> to meet demand (for chocolate)/OWTTE; <i>NOT decrease unqualified</i> Accept suitable reference to loss of income/ less money	
	(b) 15%;	1
	(c) (i) Microbe ;	1
	(ii) Biological control/ biocontrol;	1
	(d) (i) Fewer rotted pods than untreated; Answer must be comparative	1
	(ii) Does not affect other organisms/ does not damage biodiversity;	1
	(iii) Very few rotted pods/ more effective at controlling pod rot/ less rotted pods than with {Trichoderma/ biological control}/ better at killing the mould;	1
	Question 1 total	[8]

Question	Marking details	Marks Available
2	(a) (i) Bases;	1
	(ii) T and C in correct positions;	1
	(b) (i) Nucleus; Accept chromosome	1
	(ii) Twisted/ helix; NOT coil	1
Question 2 total		[4]

Question	Marking details	Marks Available
3	(a) (i) On diagram 46 and 46;	1
	(ii) Replace worn out cells/ repair damages tissue;	1
	(b) (i) Four; Identical/ same;	2
	(ii) Gametes;	1
	Question 3 Total	[5]

Question	Marking details	Marks Available									
4	(a) (i) Peristalsis;	1									
	(ii) B;	1									
(b)	<table border="1"> <thead> <tr> <th>Food</th> <th>Enzyme</th> <th>Digested food</th> </tr> </thead> <tbody> <tr> <td>Starch/ carbohy drate;</td> <td>carbohydrase</td> <td>glucose</td> </tr> <tr> <td>fat</td> <td>Lipase;</td> <td>fatty acids and Glycerol;</td> </tr> </tbody> </table>	Food	Enzyme	Digested food	Starch/ carbohy drate;	carbohydrase	glucose	fat	Lipase;	fatty acids and Glycerol;	3
Food	Enzyme	Digested food									
Starch/ carbohy drate;	carbohydrase	glucose									
fat	Lipase;	fatty acids and Glycerol;									
(c)	Absorbs water;	1									
	Question 4 Total	[6]									

Question	Marking details	Marks Available
5 (a)	(i) Protein; Chemical;	2
	(b) (i) I linear scale; must include number at origin and encompass all readings	1
	II plots;; +/- ½ small square -1 if line taken back to origin	2
	III line;	1
	(ii) I Increase then decrease; Optimum pH7.5 (from data/ graph) ;	2
	II Correct readings from their graph = 1 mark Correct answer from their graph = 1 mark If answer correct but no calculation = 2 marks	2
	(iii) Temperature affects enzyme activity; Accept reference to varying more than one variable not being a fair test	1
(c)	Work at {lower/ low} temp (than non- enzyme powders); Uses less energy/ more economic/ less costly; NOT cleans better or eq.	2
Question 5 Total		[13]

Question	Marking details	Marks Available
6/1 (a)	(i) A line drawn outside cell membrane; Nucleus, vacuole & chloroplasts (not dots) (all needed) correctly drawn; Must be able to distinguish the three different organelles	2
	(ii) <u>{Controls/regulates/selects}</u> {the movement of substances /what} into <u>and</u> out of cell; <i>NOT protect cell/maintain shape</i>	1
(b)	(i) I Into the cell ✓; II Into the cell ✓; III Cell B ✓;	3
	(ii) Diffusion;	1
	Question 6/1 Total	[7]

Question	Marking details	Marks Available
7/2 (a)	(i) Greater;	1
	(ii) Less;	1
	(iii) Greater;	1
	(iv) Less;	1
(b)	<p>Any two from</p> <p>Answers must compare bell jar and human</p> <p>The {diaphragm/rubber sheet} in bell jar model is pulled down during inspiration, whereas in the thorax the diaphragm is flattened. (OWTTE);</p> <p>The (wall of the) bell jar is {rigid/does not move}, whereas (the wall of the) {thorax/chest/ribs/ribcage} is {flexible/moves} (and moves during breathing). (OWTTE);</p> <p>Accept {thorax/ ribcage} expands <i>NOT ribs expand</i></p> <p>The bell jar cavity is filled with air, whereas the thoracic wall is filled with body fluid. (OWTTE);</p> <p>In the bell jar there's a large space around the 'lungs'/balloons in the thorax the space is very small. (OWTTE);</p>	2
Question 7/2 total		[6]

Question	Marking details	Marks Available
8/3 (a)	Place the quadrats randomly within the sample area;	1
(b)	(i) Mean = 6.2;	1
	(ii) Estimated no of lugworms = 6.2×3200 ; = 19 840; Allow ECF from (b)(i) (If answer is correct award 2 marks directly)	2
(c)	Any ref to evidence not available on surface (to count)/hidden by grass/ {casts/holes/burrows} are <u>hidden by the grass</u> / earthworms move/ earthworms do not stay in one burrow/ Accept ref to 3D aspect of population of earthworms ie there can be many earthworms at the same vertical point in the soil;	1
	Question 8/3 total	[5]

Question	Marking details	Marks Available
9/4	<p><i>Indicative content:</i></p> <p>Drop leaf in boiling <u>water</u> to {kill the leaf/ burst the chloroplasts/ {burst/destroy} cell membranes/ to get rid of waxy cuticle}</p> <p>Boil the leaf in ethanol/alcohol/methanol to remove the <u>chlorophyll</u></p> <p>Place the leaf in water to soften it</p> <p>Spread the leaf on a white tile (or any suitable surface)</p> <p>Add iodine solution to the leaf surface to test for starch</p> <p>If <u>leaf</u> turns {blue-black/ black} starch is present</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)	Lipase {digests/ breaks down/hydrolyses} <u>fat</u> (in milk) to fatty acids (and glycerol); Fatty acids {decrease pH/ cause it to become acid}; 2 nd mark only given if 1 st mark awarded	2
(b) (i)	0.135;	1
(b) (ii)	Bile breaks large globules of fat into smaller globules/ bile emulsifies fat; (accept 'pieces', 'chunks', lumps' of fat but <i>NOT molecules</i>) Increasing the surface area for (the action of) {lipase/ enzyme}; More fatty acids produced/ fatty acids produced faster; 3 rd mark only awarded if 2 nd mark awarded	3
Question 5 Total		[6]

Question	Marking details	Marks Available												
6	(a) (i) 2;	1												
	(ii) 4;	1												
	(iii) 3;	1												
(b)	<table border="1"> <tbody> <tr> <td>1st</td> <td>F</td> </tr> <tr> <td>2nd</td> <td>E</td> </tr> <tr> <td>3rd</td> <td>D</td> </tr> <tr> <td>4th</td> <td>C</td> </tr> <tr> <td>5th</td> <td>A</td> </tr> <tr> <td>6th</td> <td>B</td> </tr> </tbody> </table> <p>4 or 5 correct = 4 marks 3 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark</p>	1st	F	2 nd	E	3rd	D	4th	C	5th	A	6th	B	Max 4
1st	F													
2 nd	E													
3rd	D													
4th	C													
5th	A													
6th	B													
(c)	(i) 22;	1												
	(ii) 9;	1												
Question 6 total		[9]												

Question	Marking details	Marks Available
7	(a) (i) (Rate of) uptake of iodine decreased; to zero; No effect on uptake of water;	3
	(ii) (Process of) {active transport/ active uptake}; Requires energy; Energy release from respiration is stopped (by chemical);	3
	(b) Osmosis;	1
	Question 7 total	[7]

Question	Marking details	Marks Available
8	(a) (i) Adenine Thymine Cytosine Guanine -1 for each error	2
	(ii) Amino acids;	1
	(b) Mitosis; results in <u>genetically</u> identical cells/ same {chromosome/ genes}; NOT similar	2
	(c) Liver because it has the <u>most</u> active genes; Genes control protein production; Enzymes are proteins; 3 rd mark only awarded if 2 nd mark awarded	3
Question 8 Total		[8]

Question

Marking details

Marks
Available

9

Indicative content

6

Correct explanation for concentrations e.g.

- 0.0% - water passes in from where it is in high concentration/ water potential to where it is in low concentration/ water potential via Semi Permeable Membrane
- 0.9% - water passes in and out at the same rate.
- 3.0% - correct explanation for decrease in size i.e. opposite to explanation for 0.0%.
- A correct comment on bursting or shrivelling i.e. at extremes of concentration range - membrane is affected.

Top band must have correct explanation for the three concentrations.

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

MARK SCHEME - SUMMER 2014

Question	Marking details	Marks Available
1	(a) (i) Cell drawn , irregular outline with inclusion; Nucleus and cell membrane correctly labelled;	2
	(ii) (For red blood cell) carries <u>oxygen</u> ; (For platelets) clotting;	2
	(b) Any two from urea; carbon dioxide; soluble foods/ glucose/ amino acids/ sugar; protein; salts; hormones; antibodies; <i>(reject- references to heat distribution)</i> <i>NOT waste/ drugs/ named drugs/nutrients</i>	2
	(c) (i) I A; II D;	2
	(ii) <u>Harvey</u> ;	1
	Question 1 total	[9]

Question	Marking details	Marks Available
2	(a) (i) A Cornea; B Lens; (ii) This is where the <u>optic</u> nerve {leaves the eye/is} /there are no {light sensitive/receptor} cells here (so no image); <i>NOT attached to optic nerve</i> No impulse {generated/made}; <i>NOT retina</i> 2 nd mark only awarded if 1 st mark awarded	2
(b)	Sclera; Choroid;	2
Question 2 total		[6]

Question	Marking details	Marks Available										
3 (a)	<p>Either order</p> <p>Brain;</p> <p>Spinal cord; NOT spine</p>	2										
(b) (i)	<p>Automatic/ involuntary/ without thought;</p> <p><i>NOT choose to do it/ protective</i></p>	1										
(ii)	<table border="1"> <thead> <tr> <th>Name</th> <th>Purpose</th> </tr> </thead> <tbody> <tr> <td>Blink;</td> <td>protection of eye;</td> </tr> <tr> <td>Pupil diameter change;</td> <td>Regulating/admitting (appropriate level) of light to the eye;</td> </tr> <tr> <td>Withdrawal/ pulling away (in context);</td> <td>prevents damage/ harm to body part;</td> </tr> <tr> <td>Sneezing;</td> <td>Expel/ remove substances from nose</td> </tr> </tbody> </table>	Name	Purpose	Blink;	protection of eye;	Pupil diameter change;	Regulating/admitting (appropriate level) of light to the eye;	Withdrawal/ pulling away (in context);	prevents damage/ harm to body part;	Sneezing;	Expel/ remove substances from nose	2
Name	Purpose											
Blink;	protection of eye;											
Pupil diameter change;	Regulating/admitting (appropriate level) of light to the eye;											
Withdrawal/ pulling away (in context);	prevents damage/ harm to body part;											
Sneezing;	Expel/ remove substances from nose											
	<p>NOT cough/ choke</p>											
	Question 3 Total	[5]										

Question	Marking details	Marks Available
4	(a) (i) Excretion ; NOT filtration	1
	(b) (i) 28 and 39;	1
	(ii) 4 bars each correct height with label – 3 marks 3bars each correct height with label – 2 marks 2 bars each correct height with label – 1 mark $\frac{1}{2}$ small square tolerance in plotting height <i>Correct order (either way)</i> Kidney (family donor) Kidney (non-family donor) Lung Heart Liver Allow <u>all</u> bars correct height and in sequence but <u>no</u> labels = 1 mark	3
	(iii) They have been done for different lengths of time/ some have been done for longer (time than others);	1
	(iv) Less likely to be rejected; NOT fail Because same/ similar/compatible <u>tissue type</u> ; NOT same cells	2
	Question 4 Total	[8]

Question	Marking details	Marks Available
5	<p>(a) (i) Increase then {plateau/steady/ OWTTE}; <i>NOT stops</i> Doubles up to 40 hrs/ 300 per mm³;</p>	2
	<p>(ii) 270 - 220; (allow ecf) 50; (2 correct readings but incorrect subtraction – allow 1 mark) Correct answer = 2 marks</p>	2
	<p>(iii) {Initial increase in temperature / at 37} gives greater numbers; {Further increase in temperature /at 45} gives decreased numbers; Accept suitable alternative wording if clearly expressed NOT 'increase' unqualified</p>	2
	<p>(b) Reproducibility; Accept to have increased confidence in results <i>NOT fair test</i></p>	1
	<p>(c) (i) Slows {bacterial/<i>E.coli</i>} {growth/reproduction}; <i>NOT bacteria cannot grow</i></p>	1
Question 5 Total		[8]

Question	Marking details	Marks Available
6/1 (a)	(i) Phloem; (accept phonetic spelling)	1
	(ii) phloem clearly identified on the diagram (letter A);	1
(b)	Starch;	1
(c)	(i) Fermentation/ fermenting;	1
	(ii) Less food crops/OWTTE; More chemicals/ fertilisers/ pesticides needed; Habitat destruction/ reduce biodiversity; <i>NOT deforestation/ disrupts {ecosystems/ environment}/ destroys wildlife</i>	2
Question 6/1 Total		[6]

Question	Marking details	Marks Available
7/2 (a)	(i) Lymphocyte/ B cells;	1
	(ii) {Lymphocyte/cell} has {reproduced/cloned/produced/ divided into} (identical) copies; Many times;	2
	(iii) {Lots of/more}antibodies produced/ memory cells produced/ so there will be a rapid response;	1
(b)	Different <u>antigens</u> ; So different antibodies needed;	2
(c)	Jenner;	1
(d)	Prevent {blood loss/bleeding}; Prevents {pathogens/microbes} entering/ prevents <u>bacterial</u> infection;	2
	Question 7/2 total	[9]

Question	Marking details	Marks Available
8/3 (a)	Transpiration;	1
(b)	<p>Indicative content</p> <p>Set bubble to zero/start Reference to use of tap Correct ref to time (i.e. time taken or set period of time) Correct ref to distance (i.e. set distance or distance travelled) Record results Repeat but now with the fan Repeat experiment for both conditions Compare results</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
(c)	<p>Any two from:</p> <p>(air) temperature; NOT heat humidity; light intensity; water availability; NOT amount</p>	2
Question 8/3 Total		[9]

Question	Marking details	Marks Available
4	(a) Removal of waste;	1
	(b) (i) 68;	1
	(ii) I The salts enter urine/ excreted/ some are reabsorbed;	1
	II Concentration increases;	2
	Because water intake lower and percentage of intake that passes into urine is lower'/ because the volume of urine is lower;	
	(iii) Restore (normal) levels/ return to normal/ replenish salts;	1
	Question 4 Total	[6]

Question	Marking details	Marks Available
5	(a) (i) To show that the presence of protein is due to nephrotic syndrome/ to show that healthy rats do not have protein in their urine/ as a fair test/ comparison;	1
	(ii) Protein (molecules) too big to pass through {filter/capillaries/ glomerulus/ Bowmans capsule};	1
	(b) Any three from: number in <u>each group</u> ; age; gender; period of time of treatment; diet (food or water); NOT amount species; type; {dose/mass/volume} of {endaravone/drug}	3
	(c) Repeat/ larger sample;	1
	(d) Endaravone reduces protein in urine; Some protein in urine after treatment;	2
	Question 5 Total	[8]

Question	Marking details	Marks Available
6 (a)	(i) B; D;	2
(b)	(i) B knee jerk/ withdrawal/OWTTE;	1
	(ii) D blinking/opening and closing the eyelid quickly;	1
Question 6 total		[4]

Question	Marking details	Marks Available
7	(a) (i) Coronary <u>artery</u> ;	1
	(ii) Clotting; {Stopping/ blocking/ reducing} blood flow to heart muscle;	2
	(iii) Capillaries;	1
	(b) (i) 14 (au);	1
	(ii) Glucose/ oxygen;	1
	Question 7 total	[6]

Question	Marking details	Marks Available
8 (a)	(An overall trend of) increasing bacterial resistance with increasing use;	1
(b)	If the antibiotics enter the human food chain; they may cause bacteria to become resistant;	2
(c) (i)	Tetracycline; correct spelling	1
(ii)	$\frac{150}{250} \times 100 = 60$ (%) 250 Method; Answer; Correct answer = 2 marks	2
Question 8 Total		[6]

Question	Marking details	Marks Available
9	<p>Indicative content</p> <p>Aseptic collection of milk samples.</p> <p>Flame loop.</p> <p>Inoculating and plating samples on separate plates.</p> <p>Sealing Petri dishes.</p> <p>Incubation at stated correct temperature (20-25°C)</p> <p>Stated time (12-24 hours).</p> <p>Count colonies on plate with stale milk.</p> <p>{No/fewer} {colonies/bacteria} in boiled milk.</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
Question 9 Total		[6]



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