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# **GCSE MARKING SCHEME**

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**SUMMER 2016**

**SCIENCE – BIOLOGY B3  
4483/01/02**

## **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 Biology - B3 Foundation only questions

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
<b>1</b>		(a)	(i)		1 1	<b>A</b> (right) ventricle; <b>B</b> aorta;			Left ventricle
			(ii)		1		Line showing correct line from pulmonary vein, through atrium and ventricle and out of the aorta;	Arrow from left atrium to left ventricle <b>and</b> arrow from left ventricle to aorta	Arrow on right side
			(iii)	I	1	{Carries/ takes/ pumps} blood( from heart )to lungs;			
				II	1	Prevent backflow (of blood)( or eq. wording);	Stops blood going backwards/ ensures one way flow/ example		
			(b)		2	heart { <u>muscle/ wall</u> }; Supplied with oxygen; OR Removes carbon dioxide; From heart { <u>muscle/wall</u> };	Cardiac muscle		
	Total Mark					7			

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
2		(a)			2	Photosynthesis; Water/ soil;			
		(b)	(i)		2	Leaves - Potassium; Roots - phosphate ;			phosphorus
		(c)			1	Phloem;			
		Total Mark			5				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
3		(a)	(i)	I	2	A: Medulla; B: Pelvis;			
				II	1	Arrow touching ureter;	Arrow with no label		
			(ii)	I	1	Urine ;			urea
				II	1	Urea/ salt(s)/ water;	Sodium chloride		
		(b)	(i)		2	<b>Any two from :</b> <ul style="list-style-type: none"> <li>• Permanent solution to problem;</li> <li>• Normal everyday activities/ work normally/;</li> <li>• normal diet;</li> <li>• fewer visits to hospital/ less time in hospital;</li> </ul>		cure	Do not need to go to hospital
			(ii)	I	1	<b>Any one from :</b> <ul style="list-style-type: none"> <li>• to increase availability of organs/</li> <li>• because there is a shortage of organs/</li> <li>• more people can have a transplant/</li> <li>• more donors available;</li> </ul>			
				II	1	religious /moral/ ethical objections;			Playing god
		Total Mark			9				

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept	
FT	HT								
4		(a)		2	32 x 0.75 / 32/4 x 3; <u>24 million</u> tonnes;  Incorrect answer but suitable method =1 mark	Correct answer = 2 marks		24 alone if no working shown	
		(b)	(i)	I	2	6 points correct = 2 marks 5 points correct = 1 mark 4 or less points correct = 0 marks Check the point plotted at 100 $\pm\frac{1}{2}$ small square			
				II	1	Line quality;			
			(ii)		2	Higher temp/ at 25°C - faster breakdown/ more breakdown/ less remains;  Reason – increased growth of bacteria/ more bacteria/ increased enzyme activity;		It works better at a higher temperature	Reference to heat
			(c)		1	<b>Any one from:</b> <ul style="list-style-type: none"> <li>• More/ free <u>recycling</u> bins/</li> <li>• Raising awareness/ education/</li> <li>• refunds /rewards for recycling/</li> <li>• charge for {landfill waste/ not recycling};</li> </ul>			buying less plastic / use paper cups
Total Mark				8					

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept	
FT	HT									
5		(a)	(i)		2	<ul style="list-style-type: none"> <li>No <u>other</u> microorganisms present;</li> </ul> <p><b>Any one from:</b></p> <ul style="list-style-type: none"> <li>Which could {contaminate /change} the mycoprotein/ product/</li> <li>prevent contamination;</li> </ul>	Other microbes/ bacteria  quorn	pathogens		
			(ii)		1	<p><b>Any one from:</b></p> <ul style="list-style-type: none"> <li>Predictable product/</li> <li>minimum space/</li> <li>{control/ monitor} conditions/</li> <li>other plausible reason- cheapness/ speed/ efficient;</li> </ul>	Can make use of waste (materials)			
		(b)	(i)		1	$75/25 = 3$ ;				
			(ii)		2	$36/200 \times 100$ or $18/100 \times 100$ ; 18%; Incorrect answer but suitable method =1 mark	Correct answer = 2 marks			
			(iii)		1	Low(er) salt <b>and</b> no cholesterol for <b>1 mark</b>		Reference to figures		
		Total Mark				7				

### Biology 3 Standard demand questions

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
<b>6</b>	<b>1</b>	(a)	(i)	1 1	Plasma;  <b>Any one from:</b> transport of <ul style="list-style-type: none"> <li>• carbon dioxide/</li> <li>• soluble food/ soluble nutrients/ food molecules/ food particles/ vitamins/ minerals/ salt(s)</li> <li>• urea/</li> <li>• hormones/</li> <li>• heat;</li> </ul>	Water/ named soluble nutrient	Food Waste Substances  Blood cells	oxygen
			(ii)	1	57%;	57.0-57.5%		
		(b)	(i)	1 1	white blood cells;  <b>Any one from:</b> <ul style="list-style-type: none"> <li>• {defence/ protect} against {disease/ bacteria/ virus/ pathogen/ microbes}</li> <li>• produce antibodies/</li> <li>• produce antitoxins/</li> <li>• engulf bacteria/ virus/ pathogen</li> <li>• fight infection;</li> </ul>	Named white blood cell  Fight against disease	Provides immunity	Fight illness
			(ii)	1 1	red blood cells; transport of oxygen;		haemoglobin	
		(c)		1	Platelets;			
<b>Total Mark</b>				<b>8</b>				

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT	(a)	(i)						
7	2				2	<p><math>\frac{\text{diameter of large pupil} - \text{diameter of small pupil}}{\text{diameter of large pupil}} \times 100</math></p> <p>Accept any of the following for 2 marks</p> <p>20 &amp; 14 = 42.9  21 &amp; 14 = 50.0  20 &amp; 13 = 53.8  22 &amp; 14 = 57.1  21 &amp; 13 = 61.5  22 &amp; 13 = 69.2</p> <p>Incorrect answer but measurements of pupil correct = 1 mark</p>	Correct answer = 2 marks		
			(ii)		1	(Nerve) impulses (from the brain);	Electrical signals		Messages/ commands/ signals
					1	do not get to the { <u>iris muscles/ effector</u> in the <u>iris</u> }; 2 <sup>nd</sup> mark linked to 1 <sup>st</sup> mark			
		(b)	(i)		1	Retina;			
			(ii)		1	fast/automatic/ involuntary;	Not under conscious control/ do not have to think about it		Unconscious/ subconscious / instant
Total Mark					6				

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
<b>8</b>	<b>3</b>	(a)		1 1	Penicillin {diffused/spread / comes/ dispersed} out; it <u>killed/ destroyed</u> bacteria;			Inhibits growth
		(b)		1	{MRSA/it} is resistant to {penicillin/ antibiotics};			immune
		(c)		1	Antibiotics;			
		Total Mark		4				

Question Number		Mark	Answer
FT	HT		
9	4	6	<p><i>Indicative content:</i></p> <ul style="list-style-type: none"> <li>• Record initial mass/ weight of potometer</li> <li>• Blow air travelling at 1m/s onto cut leafy shoot</li> <li>• For set time eg 5 minutes</li> <li>• Record mass/ weight of potometer</li> <li>• Repeat for air speed at 10m/s</li> <li>• Expected result - potometer would lose more mass/ weight at 10m/s</li> <li>• Conclusion: greater the air/wind speed the greater the rate of transpiration</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> <p><b>1-2 marks</b> The candidate makes 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>
Total Mark		6	

### Biology 3 Higher only questions

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	<b>5</b>	(a)	(i)		1	The higher the temperature (the meat is stored at) the more {bacteria/(bacterial) colonies};	ORA Bacteria reproduce faster at higher temperatures		
			(ii)	I	1	8;			
				II	1 1	At -20°C bacteria do not multiply/reproduce/ grow; therefore meat is preserved/doesn't go off;	Meat remains fresh		Bacteria killed/ meat lasts longer
		(b)	(i)		1	Any one from: <ul style="list-style-type: none"> <li>• To prevent contamination of the {agar/ jelly}/</li> <li>• to make sure that the bacteria growing on the {agar/ jelly} came from the meat only (OWTTE);</li> </ul>			Reference to 8 colonies
			(ii)		1	Any one from <ul style="list-style-type: none"> <li>• Flaming of wire loop/ heat in Bunsen</li> <li>• sterilisation of agar/sterilisation of equipment/ autoclave equipment/</li> <li>• correct sealing of Petri dish/</li> <li>• disinfect the benches/</li> <li>• any other relevant point;</li> </ul>		Wire loop sterilised	
Total Mark					6				

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
	<b>6</b>	(a)		2	$\frac{125}{700} \times \frac{100}{1}$ ; Answer = 18 = 2 marks Answer = 17.85/ 17.9 = 1 mark			
		(b)	(i)	2	Increases (blood) pressure; <b>Any one from:</b> For filtration/ ultrafiltration/ forcing molecules {through the membrane/ out of the blood} (or description of);			
			(ii)	4	1. <u>Increase</u> in ADH;  2. Causes an increase in (re)absorption of water;  3. From tubules/ from named part of nephron/ into the blood/ from Z;  4. Causes increase in concentration of urine/ less water excreted/ blood less concentrated/ small volume of urine/ conserve water/ less urine/ description of water regulation;  3 <sup>rd</sup> mark linked to 2 <sup>nd</sup> mark			
		Total Mark		8				

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT	(a)	(i)	1	The dye;			
	<b>7</b>		(ii)	1	Urea (solution);			
		(b)		2	Tubing is permeable to urea/ urea passed through tubing/ urea passed into the dye; dye does not pass through tubing;		Chemical does not pass through tubing	
		Total Mark		4				

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
	<b>8</b>				5	Stage 1 Vaccine/ vaccination; Stage 2 Antigens; Stage 3 lymphocyte/ memory cells; Stage 4 Mitosis; correct spelling Stage 5 Antibodies;			
		Total Mark			5				

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
	<b>9</b>	(a)		4	<b>A</b> coordinator / spinal cord; <b>B</b> sensory neurone/ sensory nerve cell; <b>C</b> motor neurone/ motor nerve cell; <b>D</b> relay neurone / interneurone / intermediate neurone / internuncial neurone/ interconnecting neurone/ connecting neurone;			CNS/ spinal column/ spine
		(b)		1	At <b>B</b> arrow points towards relay At <b>C</b> arrow points away from relay <b>(Both correct for 1 mark)</b>			
		(c)		2	<b>XX</b> cannot {feel/ detect} {stimulus / pain / heat};  <b>YY</b> cannot use {muscle / effector}/ {muscle/ effector} will not work/ muscle will not {contract/move};		Prevents impulse getting to the spinal cord/ muscle	Do not feel {anything/ it}
		Total Mark		7				

Question Number		Mark	Answer
FT	HT		
	10	6  QWC	<p><b>Indicative Content</b></p> <p><b>blood vessels entering the body organs</b></p> <ul style="list-style-type: none"> <li>• high oxygen concentration from the lungs.</li> <li>• via the pulmonary vein, heart, aorta</li> <li>• carbon dioxide concentration is low</li> <li>• because most has left from the lungs.</li> </ul> <p><b>blood vessels leaving the body organs</b></p> <ul style="list-style-type: none"> <li>• low concentration of oxygen</li> <li>• because most has passed into the cells of the body organs</li> <li>• for respiration.</li> <li>• high concentration of carbon dioxide</li> <li>• due to it being produced by the cells and moving out during respiration</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> <p><b>1-2 marks</b> The candidate makes 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>
Total Mark		6	