



...day June 20XX – Morning/Afternoon

GCSE (9–1) Biology A (Gateway Science)

J247/03 Paper 3 Higher tier

SAMPLE MARK SCHEME

Duration: 1 hour 45 minutes

MAXIMUM MARK 90

SPECIMEN

This document consists of 16 pages

MARKING INSTRUCTIONS**PREPARATION FOR MARKING****SCORIS**

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris assessor Online Training*; *OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal <http://www.rm.com/support/ca>
3. Log-in to scoris and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the scoris 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the scoris messaging system.

5. Work crossed out:
 - a. where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
 - b. if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.
6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.
7. There is a NR (No Response) option. Award NR (No Response)
 - if there is nothing written at all in the answer space
 - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
 - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question.Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).
8. The scoris **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.** If you have any questions or comments for your Team Leader, use the phone, the scoris messaging system, or email.
9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer. Once the level is located, award the higher or lower mark:

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.

In summary:

The skills and science content determines the level.

The communication statement determines the mark within a level.

11. Annotations

Annotation	Meaning
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
()	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

12. Subject-specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

The breakdown of Assessment Objectives for GCSE (9–1) in Biology A:

	Assessment Objective
AO1	Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
AO3	Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.
AO3.1	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
AO3.2	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
AO3.3	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.

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SECTION A

Question	Answer	Marks	AO element	Guidance
1	D	1	1.1	
2	D	1	1.1	
3	B	1	1.1	
4	C	1	2.1	
5	A	1	1.1	
6	C	1	1.2	
7	C	1	1.1	
8	A	1	1.1	
9	D	1	1.1	
10	B	1	1.1	
11	A	1	1.1	
12	D	1	1.2	
13	D	1	1.2	
14	B	1	1.1	
15	A	1	2.1	

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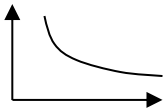
SECTION B

Question		Answer	Marks	AO element	Guidance
16	(a)	produces acids = (1) but produces fatty acids = (2)	2	2.2	
	(b)	Y axes correctly labelled, including units (1) Y axis even scales occupying more than half of the page (1) all points correctly plotted = (2) but at least 3 points correctly plotted = (1) line of best fit (1)	1 1 2 1	2.2 2.2 2 x 2.2 2.2	
	(c)	at 20°C: slower reaction (1) particles moving more slowly (1) less frequent collisions (1)	1 1 1	3.1a 2.1 2.1	allow reverse argument referring to 40°C
	(d)	At 80°C: slower reaction (1) enzyme denatured (1) shape of active site changed / can not bind to substrate (1)	1 1 1	3.1a 2.1 2.1	allow reverse argument referring to 40°C

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Question		Answer	Marks	AO element	Guidance	
	(e)	(i)	(optimum) could be either side of 40°C / could be anywhere between 40°C and 60°C (1)	1	3.1a	
		(ii)	do more repeats (1)	1	3.3b	
			idea of narrower intervals around 40°C (1)	1	3.3b	allow 30-50°C
	(f)		any two from use a colorimeter – so it's objective / AW (1) have the same student doing all observations – so there is a consistent judgement / AW (1) repeat the experiment at each temperature – can take mean/average (1)	2	2 x 3.3b	allow light meter allow colour chart / serial dilution
17	(a)	(i)	bubbles may be different sizes (1)	1	2.2	
			may miscount / difficult to count (1)	1	2.2	
		(ii)	would measure total volume (1)	1	2.2	
	(b)	(i)	 line decreasing = (1) but curved line decreasing = (2)	2	2 x 2.1	
		(ii)	any two from as the distance increases, the light intensity decreases (1) as the light intensity decreases, there is less	2	2 x 1.1	

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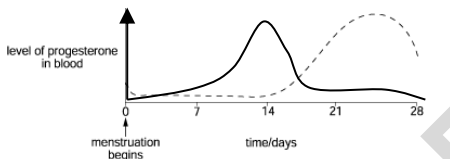
Question			Answer	Marks	AO element	Guidance
			light/energy for photosynthesis (1) the line curves because the light will not decrease to zero / AW (1)			
	(c)	(i)	light energy (1) splits water (1) in chloroplasts (1)	1 1 1	1.1 1.1 1.1	
		(ii)	respiration (is also occurring) (1) some oxygen is used up (in respiration) / AW (1)	1 1	2.1 2.1	allow idea that oxygen given out is the net production
18	(a)		(more water/mass lost when fan is on because) air movement removes water vapour / reduces water vapour concentration outside leaves / increases water vapour concentration gradient (1) so evaporation / diffusion happens more quickly (1)	1 1	2.2 1.2	allow reverse argument
	(b)	(i)	(because otherwise) an increase in light intensity would open stomata (1) increasing transpiration / ORA (1)	1 1	2.2 2.2	
		(ii)	(because otherwise) an increase in temperature would increase evaporation / ORA (1)	1	2.2	

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Question		Answer	Marks	AO element	Guidance
19	(a)	detected by receptors in skin (1)	1	2.1	to gain marks these need to be in the correct sequence ignore brain
		impulse sent along sensory neurone (1)	1	1.1	
		to spinal cord / CNS (1)	1	1.1	
		impulse sent along motor neurone (1)	1	1.1	
		to (hand/arm) muscles / effectors (1)	1	2.1	
	(b)	(i)			
		conclusion: as diameter increases so does speed of impulse (1)	1	3.2b	must include example, but allow other valid examples from data
		but there are exceptions e.g. all speeds for B are greater than for C even though the diameters overlap (1)	1	3.2b	
(ii)					
		cannot make a (valid) conclusion (1)	1	3.2b	
		although D has lowest speeds it also has the smallest diameter (and the results might be due to this) (1)	1	3.2b	
20	(a)	absorbed water (1)	1	2.1	allow (movement) from higher to lower water potential / from higher to low water concentration
		higher water potential/water concentration outside ora (1)	1	3.1a	
	(b)	(potato has) same water potential / water concentration (as solution) (1)	1	3.1a	
		no (net) water loss or gain (1)	1	2.1	

Question		Answer	Marks	AO element	Guidance	
	(c)	(i)	-10 (%) (2) but 10 (%) (1)	2	2 x 2.1	
		(ii)	can still compare even if original sizes are different (1)	1	2.2	
	(d)	(i)	ignores changes to width (1)	1	3.3a	
		(ii)	measure (changes to) volume / mass (1)	1	3.3b	
21	(a)	(i)	 <p>line rises and falls (1)</p> <p>peaks before oestrogen (1)</p>	1 1	1.1 1.1	before/around day 14
		(ii)	FSH stimulates oestrogen production (1) oestrogen inhibits FSH production (1)	1 1	1.1 1.1	

	(b)*	<p>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p>Level 3 (5–6 marks) An explanation as to how the effects of endometriosis could be relieved by treatment with progesterone <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Level 2 (3–4 marks) An explanation of the effects of the levels of oestrogen and progesterone levels and their effect on the endometrial cells outside the uterus <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i></p> <p>Level 1 (1–2 marks) Draws a simple explanation of how the hormones affect the endometrial cells <i>The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.</i></p> <p>0 marks <i>No response or no response worthy of credit.</i></p>	6	2 x 1.1 2 x 2.1 2 x 3.1b	<p>AO3.1b: Analysis of the information and evaluation of the effect of the treatment</p> <ul style="list-style-type: none"> To stop the cells building up oestrogen levels should be kept low Cell build up can be reduced by keeping progesterone levels high Progesterone can be given as a (contraceptive) pill to maintain high levels of progesterone Progesterone mimics pregnancy and halts the menstrual cycle <p>AO2.1: Applying knowledge of hormone levels to endometriosis/endometrial cells</p> <ul style="list-style-type: none"> An explanation that when oestrogen levels are high the levels of progesterone are low An explanation that the (endometrial) cells outside the uterus would build up and breakdown as normal An explanation that during the breakdown stage the cells would not be able to leave the body in the normal way <p>AO1.1: Demonstrate knowledge and understanding of the female sex hormones and menstruation</p> <ul style="list-style-type: none"> A simple explanation of the effect of oestrogen on the cells of the womb during menstruation from the graph e.g. builds up the cell lining of the uterus A simple explanation of the effect of progesterone on the cells of the womb during menstruation from the graph e.g. maintains the cell lining of the uterus
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22	(a)	(i)	6 (1)	1	1.1	
		(ii)	7.6×10^{-3} 3.0×10^{-3} 1.5×10^{-3} correct calculation of 1/time (1) answer in standard form (1)	1 1	1.2 2.1	
		(iii)	as size increases the rate of diffusion decreases / as size increases the diffusion distance increases (1) idea that would take too long for substances to diffuse in and out of large organisms (1)	1 1	3.2b 1.1	ORA
		(iv)	spheres are an improvement because animal cells tend to be round shapes not cubes (1) students used cubes because they are easier to cut/prepare (1)	1 1	2.1 2.2	allow the calculations of surface area:volume are easier

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	(b)	<p>any five from</p> <p>small size (1)</p> <p>flexible (1)</p> <ul style="list-style-type: none"> • to get in to small vessels/capillaries (1) <p>biconcave disc shape (1)</p> <ul style="list-style-type: none"> • large surface area:volume (1) <p>haemoglobin (1)</p> <ul style="list-style-type: none"> • to carry oxygen (1) <p>lack of nucleus (1)</p> <ul style="list-style-type: none"> • (so) more room (for haemoglobin) (1) 	5	5 x 1.1	<p>can only gain explanation marks (bullet points) if correctly linked to a feature</p> <p>max 4 marks if only given features without explanations</p>
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