

OCR

Oxford Cambridge and RSA

...day June 20XX – Morning/Afternoon

AS Level Biology B (Advancing Biology)

H022/02 Biology in depth

SAMPLE MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 70

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:
- where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
 - 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.
- Decide the level that **best fits** the answer – match the quality of the answer to the closest level descriptor.
- To select a mark within the level, consider the following:
 - Higher mark:** A good match to main point, including communication statement (in italics), award the higher mark in the level
 - Lower mark:** Some aspects of level matches but key omissions in main point or communication statement (in italics), award lower mark in the level.

Level of response questions on this paper are **2(a)** and **4(b)**.

SPECIMEN

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.

Question		Answer	Marks	Guidance
1	(a)	Any 3 from: tertiary structure gives specific shape of active site ✓ asparagine has complementary shape to active site ✓ enzyme-substrate complex can be formed ✓ lowers activation energy ✓	3	
	(b)	(normal cells) do not use asparagine ✓	1	
	(c)	Any 1 from: acts as antigen ✓ destroyed by cell's immune system ✓	1	
		Total	5	

Question		Answer	Marks	Guidance
2	(a)	<i>idea of a molecule containing mainly carbon and a number of other elements ✓</i> sucrose / protein / amino acids, used as illustration ✓	2	Examples of other elements could include hydrogen, nitrogen, sulphur
	(b)	(i)	1	
		(ii)	2	
	(c)*	<p>Level 3 (5–6 marks) A detailed explanation of both loading and movement by mass flow, including reference to sources and sinks and the features and roles of the sieve tube elements and companion cells.</p> <p><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) A partial explanation of both loading and movement by mass flow. Includes reference to sources and sinks or the features or roles of the sieve tube elements or companion cells.</p> <p><i>There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.</i></p>	6	<p>Examples of relevant material could include the following:</p> <p><i>Loading</i></p> <ul style="list-style-type: none"> loading into companion cells location of companion cells at a source or named source active loading of sucrose (using ATP) mitochondria presence in companion cells description of mechanism of H⁺ gradient and co-transport movement via plasmodesmata into sieve tube elements <p><i>Movement</i></p> <ul style="list-style-type: none"> mass flow from source to sink ref to high hydrostatic pressure at source ref to inflow of water by osmosis at the source (creating the pressure) ref to passage through sieve plates or cytoplasmic connections

Question			Answer	Marks	Guidance
			<p>Level 1 (1–2 marks) An explanation of either loading or movement.</p> <p><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 No response or no response worthy of credit.</p>		<ul style="list-style-type: none"> • ref to low hydrostatic pressure at the sink • ref to unloading at the sink <p>ALLOW use of annotated diagrams</p>
			Total	11	

Question			Answer	Marks	Guidance
3	(a)	(i)	evidence of tools ✓ evidence of tool marks on fossilised animal bones ✓	2	
		(ii)	factor e.g. climate change ✓ link e.g. could cause migration ✓	2	Answer should link factor to description
		(iii)	Any 2 from: settlements ✓ could farm animals and plants ✓ <i>idea that</i> humans could control breeding of animals ✓ increase food availability ✓	2	
	(b)		<i>idea that</i> position of hyoid bone may not be determined from fossils ✓ <i>idea that</i> further evidence would be needed e.g. tongue position ✓	2	
			Total	8	

Question		Answer	Marks	Guidance
4	(a)	X (surface glycoprotein) for binding to host cell ✓	1	
	(b)*	<p>Level 3 (5–6 marks) The means of transmission is clearly understood and described in detail, using an example. How the spread can be controlled is discussed in detail and the learner considers more than one measure of control.</p> <p><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) The means of transmission is described. At least one good suggestion of how to control the spread of the virus is given.</p> <p><i>There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.</i></p> <p>Level 1 (1–2 marks) Relevant comment about the means of transmission or control of spread.</p> <p><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 No response or no response worthy of credit.</p>	6	<p>Examples of relevant material could include the following:</p> <p><i>means of transmission</i></p> <ul style="list-style-type: none"> • spreads from person to person in body fluids • named example e.g. from mother to baby in uterus • once in blood virus enters T lymphocytes • may remain dormant for long period <p><i>controlling the spread</i></p> <ul style="list-style-type: none"> • screening donated blood • education • named example e.g. giving sterile needles to drug users • epidemiological testing • access to means of prevention e.g. condom clinics

Question			Answer	Marks	Guidance
5	(a)	(i)	<i>idea that</i> multiple stains / different stains used ✓ <i>idea that</i> different stain taken up by different tissues / different tissues are stained different colours ✓	2	
		(ii)	whole root area 149.57 cm ² ✓ stele root area 66.48 cm ² ✓ proportion of root area that is stele – 2.25 ✓	3	ALLOW range 147 -153 cm ² ALLOW range 66 – 69 cm ² ALLOW 2.22 – 2.27
		(iii)	Any 2 from: sterile equipment / disposable gloves ✓ (because) blood samples, potentially hazardous / biohazard ✓ example of risk e.g. HIV ✓	2	
		(iv)	<i>'The blood smear of patient B appears normal'</i> <i>idea that</i> appearance and number of both erythrocytes and leucocytes is as expected ✓ <i>'The same differential stain was used in preparing both blood smears'</i> <i>idea that</i> nuclei of leucocytes in both smears are same colour ✓ <i>'The cell labelled X in both micrographs can be identified as a lymphocyte'</i> <i>idea of</i> large round nucleus /small cytoplasm: nuclear ratio ✓ <i>'Patient A has a type of blood cancer'</i> <i>idea of</i> abnormally large number of, leucocytes / lymphocytes ✓	4	

Question		Answer	Marks	Guidance
	(v)	<p>Any 1 from: <i>idea that</i> the cause of the abnormal blood smear could be temporary ✓ ethical reasoning e.g. false positive ✓ blood of patient A may be atypical ✓</p>	1	
(b)	(i)	44% ✓✓	2	1 mark for calculation. $500 - 280 \times 100 / 500$
	(ii)	<p>Any 3 from: decrease in risk with ageing from 0–9 years ✓ remains steady / age has little effect, from 10–29 years ✓ increase in risk with ageing from 30–74 years ✓ decrease in risk with ageing from 75–85 years in males ✓ after 35 years risk for males increases more than females ✓ age 85+ risk is greater for females ✓</p>	3	
(c)	(i)	<p>Any 5 from: <i>advantages of flow cytometry</i> <i>idea that</i> large number of cells can be counted in short period of time ✓ number and type of cell can be counted ✓ can measure physical characteristics of the cell ✓ can determine, DNA content / protein and enzymes, in cell ✓ <i>disadvantages of flow cytometry</i> expensive ✓ flow cytometry machines are large ✓ highly trained technicians are required ✓</p>	5	ORA for other counting methods

Question		Answer	Marks	Guidance
	(ii)	immune system of mouse B produces large number of T lymphocytes ✓ immune system of mouse C has not produced many T lymphocytes ✓ immune system of mouse C is prevented from producing enough T lymphocytes when injected with tumour cells ✓	3	
		Total	25	

SPECIMEN

Question		Answer	Marks	Guidance
6	(a)	C A D E B ✓✓✓	3	First correct C – one mark, last correct B – one mark, ADE anywhere in that order – 1 mark
	(b)	(i)	0.58 ✓✓	2 ALLOW 2 marks for the correct answer with no working ALLOW 1 mark for calculation without final step $24 - 17 = 7 / 3 = 2.3$
		(ii)	Any 1 from: protein for production of new cells / enzymes / skin / bone ✓ vitamin D for production of, bones / teeth ✓ phosphorus / calcium, for production of, bones / teeth ✓	1
			Total	6