

OCR • GCSE BIOLOGY J247

Higher Tier — Paper 3

June 2025 exam series

MARK SCHEME

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Higher

GCSE

Biology A Gateway

J247/03: Paper 3 (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2025

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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MARKING INSTRUCTIONS

PREPARATION FOR MARKING

RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM 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 available in RM Assessor.
3. Log-in to RM Assessor and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

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 RM Assessor 50% and 100% (traditional 40% 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 RM Assessor messaging system.

5. Crossed-Out Responses

Where a candidate has crossed out a response and provided a clear alternative then the crossed-out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed-out response where legible.

Rubric Error Responses – Optional Questions

Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM Assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple-Choice Question Responses

When a multiple-choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate). *When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.*

Contradictory Responses

When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only one mark per response)

Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth two or more marks)

If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space).

Longer Answer Questions (requiring a developed response)

Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

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 the annotation 'SEEN' to confirm that the work has been seen and mark any responses using the annotations in section 11.
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 is not an attempt at the question.

Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).

8. The RM Assessor **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.**
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.

Level of response question on this paper is **20(a)**

11. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
	Benefit of doubt given
	Contradiction
	Rounding error
	Error in number of significant figures
	Error carried forward
	Level 1
	Level 2
	Level 3
	Benefit of doubt not given
	Noted but no credit given
	Ignore

12. Abbreviations, annotations and conventions used in the detailed Mark Scheme (to include abbreviations and subject-specific conventions).

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
✓	Separates marking points
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

13. 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.

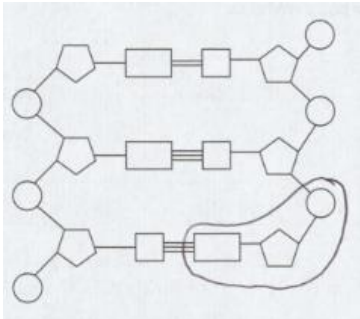
For answers to Section A if an answer box is blank ALLOW correct indication of answer e.g. circled or underlined.

Question	Answer	Marks	AO element	Guidance
1	B	1	2.1	
2	D	1	1.1	
3	A	1	1.1	
4	C	1	1.1	
5	C	1	1.1	
6	B	1	2.1	
7	D	1	2.1	
8	C	1	1.1	
9	A	1	2.2	
10	C	1	2.1	
11	D	1	2.1	
12	C	1	2.1	
13	A	1	1.1	
14	B	1	2.1	
15	C	1	2.1	

Question			Answer	Marks	AO element	Guidance
16	(a)		Controls the size of the pupil B Focuses the light on the retina A Transmits electrical impulses to the brain D Detects light C ✓✓✓	3	3 × 1.1	ALL correct = 3 marks 2 or 3 correct = 2 marks 1 correct = 1 mark
	(b)	(i)	Student has <u>mild</u> short sightedness/myopia ✓ (Glasses/contact lenses) with concave lenses / laser eye surgery ✓	2	2 × 3.2b	
		(ii)	First check the answer on the answer line If answer = 6 (years) award 2 marks 10 (years with the drug) and/or 4 (years without) ✓ = 6 (years) ✓	2	2 × 2.2	

Question			Answer	Marks	AO element	Guidance
17	(a)		(To be able) to see the chromosomes/nucleus/DNA/genetic material/sub-cellular structures/organelles ✓	1	2.2	ALLOW because DNA/chromosomes/genetic material/sub-cellular structures/organelles are colourless/transparent IGNORE to make structures/cells visible
	(b)		Any four from: Place (the slide) on the stage/platform ✓ Use low power/magnification (objective lens) ✓ Move the stage / use the (focussing) knob ✓ To <u>focus</u> on the cells ✓ Change to a higher objective lens/higher power/magnification (and refocus) ✓	4	4 × 1.2	ALLOW smallest lens Only award this marking point if second marking point is awarded
	(c)		First check the answer on the answer line If answer = 90 award 2 marks 120 × 0.75 ✓ =90 ✓	2	2 × 2.1	If no answer on the answer line, then award 2 marks for answer = 90 in table ALLOW any correct calculation
	(d)		In region C and/or D no cells are dividing/undergoing mitosis / Cells are only dividing/undergoing mitosis in areas A and B ✓	1	3.1b	ALLOW in region C and/or D there are zero

Question			Answer	Marks	AO element	Guidance
	(e)		Compare the results with other students' results Make a more accurate conclusion Check that the results are reproducible Use a lower magnification so that more cells can be counted Sample from more points in regions A and B ✓✓	2	2 × 3.3b	DO NOT ALLOW more than one line from a box
	(f)		Phloem ✓	1	1.1	

Question			Answer	Marks	AO element	Guidance
18	(a)			1	1.1	ALLOW any adjacent sugar, phosphate and base circled
	(b)		Gene ✓ Transcribed ✓ Ribosome ✓ Amino acids ✓ Translated ✓	5	5 × 1.1	
	(c)		Location: In the nucleus for eukaryotic and in the cytoplasm for bacterial/prokaryotic cells ✓ Shape: Linear/straight/ribbon/strand/AW in eukaryotic cells and circular/loop in bacterial cells ✓	2	2 × 2.1	IGNORE reference to plasmid IGNORE double helix in eukaryotic (but a loop in prokaryotic) IGNORE as chromosomes in eukaryotic (but a loop in prokaryotic)

Question			Answer	Marks	AO element	Guidance
19	(a)		Any three from: Light is absorbed/collected by chlorophyll/chloroplasts / it takes place in the chloroplasts ✓ Light energy used to make ATP ✓ Two stage process / light independent and light dependant stages ✓ Water molecule is split into hydrogen and oxygen ✓ Carbon dioxide is combined with hydrogen to make glucose ✓	3	3 × 1.1	IGNORE occurs in chlorophyll ALLOW Water molecule is split into hydrogen and hydroxide ions ALLOW 1 mark for identifying both the reactants and products if MP 4 or 5 are not awarded ✓
	(b)		Solution X = soda lime / sodium hydroxide / potassium hydroxide ✓ Solution Y = iodine (solution) ✓	2	2 × 2.2	

Question		Answer	Marks	AO element	Guidance
20	(a)	Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question. Level 3 (5–6 marks) Design which explains the method to be used AND includes measurements to be taken AND includes details of how to make sure results are valid. <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i> Level 2 (3–4 marks) Design which explains the method to be used and includes measurements to be taken OR Design which explains the method to be used and includes details of how to make sure results are valid. OR Includes measurements to be taken and includes details of how to make sure results are valid. <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i> Level 1 (1–2 marks) Design which explains the method to be used OR includes measurements to be taken OR includes details of how to make sure results are valid.	6	3 × 3.3a 3 × 2.2	AO3.3a Analyse information and ideas to develop experimental procedures. Method • mix catalase and hydrogen peroxide (in test tubes/measuring cylinder) • use of a water bath/incubators (to control temperature). • use a range of temperatures / use three or more temperatures Measurements to be taken • the height/volume of the foam / the time taken for foam to reach a certain height / the volume of oxygen produced IGNORE counting bubbles / measuring decrease in mass IGNORE amount of foam, unless gives details e.g. measure amount of foam using a ruler/gas syringe AO2.2 Apply knowledge and understanding of techniques and procedures • to ensure valid results, variables need to be controlled • same volume of catalase • same volume of hydrogen peroxide • same concentration of hydrogen peroxide • same concentration of enzyme • set period of time for reaction to take place • catalase from the same source

Question			Answer	Marks	AO element	Guidance
			<i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i> 0 marks <i>No response or no response worthy of credit.</i>			IGNORE amount of catalase/hydrogen peroxide
	(b)		Optimum pH is 9 / idea that highest rate is at pH 9 ✓ Enzyme is active over the pH range of pH 7-11 ✓ Reaction stops beyond pH 11/below pH 7 AND enzymes are denatured ✓	3	3 × 3.2b	ALLOW only active in (weak) alkaline conditions / inactive from pH 1-7 and pH 11-14 / inactive below 7 and above 11 / activity increases from pH 7 and decreases to pH 11 Enzyme denatured below 7 and above 11 so rate is zero/inactive = 2 marks
	(c)		Any three from: Enzymes are <u>specific</u> (to one substrate) ✓ <u>Active site</u> has a particular/specific/correct shape ✓ (Only) hydrogen peroxide will fit/bind with the <u>active site</u> ✓ (Only) hydrogen peroxide will form an enzyme-substrate complex ✓	3	3 × 2.1	ALLOW enzymes show specificity ALLOW active site has a complementary shape to hydrogen peroxide DO NOT ALLOW active site has the same shape as hydrogen peroxide

Question			Answer	Marks	AO element	Guidance
21	(a)		Cortex indicated on diagram ✓	1	1.1	Label line must end inside the cortex layer Circled area must be mainly covering the cortex
	(b)		First check the answer on the answer line If answer = 15.6 (l) award 2 marks 650 x 24 = 15 600 ✓ 15 600 ÷ 1000 = 15.6 (l) ✓	2	2.2 1.2	ALLOW 16 rather than 15.6 for 2 marks
	(c)		Pituitary ✓ Kidney tubule ✓ High(er) ✓ Low(er) ✓	4	4 × 1.1	ALLOW collecting duct / DCT / nephron ALLOW big(ger) / large(r) / greater / ALLOW small(er) / dilute / weak(er) / decreased / increased water
	(d)		Horse will drink more water ✓	1	2.1	ALLOW thirsty IGNORE dehydration
	(e)	(i)	(Oestrogen) thickens/repairs (the lining of) the uterus / Inhibits FSH / LH ✓	1	1.1	IGNORE maintains the uterus lining
		(ii)	Horses are in stables/not outside which is cruel/unethical/stressful/means diseases can spread/restricts movement ✓ The bag they wear to collect urine may be uncomfortable/cause infections/restricts movement ✓	2	2 × 3.1b	IGNORE kept in stables/cruel/unethical unless qualified

Question			Answer	Marks	AO element	Guidance
22	(a)		Less/no insulin (produced) / insulin less/not effective ✓ Less/no sugar is stored as glycogen/converted to glycogen ✓ High(er) blood sugar level (so more available to attach to haemoglobin) ✓	3	3 × 2.1	IGNORE cannot regulate their blood sugar levels
	(b)		Any two from: Exercise (more) ✓ Eat healthier diet ✓ Stop smoking ✓	2	2 × 1.1	ALLOW correct references to specific changes in diet IGNORE eat less / better diet / balanced diet
	(c)		Any two from: They are close to controlling it/some success at managing it/are controlling it AND their level is lower than it was when they were diagnosed/their level has decreased ✓ However, they still have (Type 2) diabetes / level is still above 6.5% / still exceed the normal range ✓ The readings levelled off in the last 3 results/increased in last result AND idea that the patient got complacent/further monitoring needed/different way of managing needed ✓	2	3.1a 3.2a	

Question			Answer	Marks	AO element	Guidance
	(d)		First check the answer on the answer line If answer = 14.3 (%) award 3 marks $(36\,000 - 31\,500 =) 4\,500 \checkmark$ $(4500 / 31\,500 =) 0.142857 \checkmark$ $(0.142857 \times 100 =) 14.3 (\%) \checkmark$	3	3×2.1	ALLOW 14.2857 etc for 2 marks ALLOW one mark for an incorrect answer if it is clearly shown that it has been correctly rounded to three significant figures.

Question			Answer	Marks	AO element	Guidance
23	(a)		<pre> graph LR Cerebellum[cerebellum] --- Coord[coordinates conscious movement] Cerebrum[cerebrum] --- Heart[controls heart rate and breathing rate] Medulla[medulla] --- Learn[responsible for learning, language and memory] </pre> ✓✓	2	2 × 1.1	All 3 lines correct = 2 marks 1 or 2 lines correct = 1 mark
	(b)		<u>Diffuses</u> across the gap/synapse ✓ Triggers a nerve impulse/electrical signal in the next neurone ✓	2	2 × 1.1	ALLOW allows an impulse to travel across a synapse / allows an impulse to travel from neurone to neurone IGNORE signal/message rather than impulse
	(c)		Any four from: Ethical issues with experimenting on (live) animals / killing/harming animals for experimentation ✓ Results in animals may be different to humans ✓ Idea that the brain is very complex / brain is made of neurones with many different connections / some areas of the brain are difficult to reach ✓ Idea that it is difficult to get research subjects willing to participate/give consent ✓ Could cause further harm to people with the disease / may damage other areas of the brain ✓	4	4 × 2.2	ALLOW differences between human and animal brains ALLOW many different parts of the brain may be involved / many neurones close together IGNORE patients may not be capable of giving consent

Question			Answer	Marks	AO element	Guidance
	(d)		Any three from: Study size was small / only 41 patients ✓ Trial only lasted nine months / improvement may not last for longer period of time ✓ Increase in number of cells may not indicate improvement in movement / do not know if the symptoms of Parkinsons improved ✓ Will have to assess risks or possible damage ✓	3	3 × 3.1b	ALLOW trial on a larger group needed ALLOW need to study for a longer time ALLOW may have side effects IGNORE may have long term effects Must see if it is safe and effective long term = 2 marks IGNORE reference to placebo effect

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