Smart Edge!
More Than Knowledge

OCR · GCSE COMBINED SCIENCE A (GATEWAY) J250

Biology — Higher Tier, Paper 1

June 2025 exam series

MARK SCHEME

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Higher

GCSE

Combined Science Biology A Gateway Science

J250/07: Paper 7 (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2025

Oxford Cambridge and RSA Examinations

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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 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 RM Assessor messaging system.

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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 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).

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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.

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 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.**

   If you have any questions or comments for your Team Leader, use the phone, the RM Assessor 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.

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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 **14(b)***

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11. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
BOD	Benefit of doubt given
CON	Contradiction
RE	Rounding error
SF	Error in number of significant figures
ECF	Error carried forward
L1	Level 1
L2	Level 2
L3	Level 3
NBOD	Benefit of doubt not given
SEEN	Noted but no credit given
I	Ignore

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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

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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 Combined Science 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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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	D	1	1.1	
2	C	1	2.1	
3	B	1	1.2	
4	A	1	2.2	
5	D	1	1.1	
6	A	1	1.1	
7	C	1	1.2	
8	A	1	1.2	
9	C	1	1.1	
10	C	1	1.1	

Question			Answer	Marks	AO element	Guidance
11	(a)	(i)	Potometer ✓	1	1.2	
		(ii)	Measure the initial position and final position of bubble ✓ distance moved (by bubble) time taken ✓	2	2 × 3.1a	**ALLOW** measure distance moved by bubble / measure change in distance of bubble **IGNORE** idea of just measuring final position **ALLOW** measure how far the bubble moves in 1 minute = 2 marks
		(iii)	Idea of increasing accuracy ✓	1	3.3b	**ALLOW** to reduce effect of errors **IGNORE** to find an average/mean
		(iv)	**Any one from:** Compare results with someone else (such as another student) ✓ Repeat the experiment with different equipment ✓	1	3.3a	 **IGNORE** reproduce the experiment and compare the results **IGNORE** repeat and see if the results are similar **ALLOW** repeat the experiment with a different type of shoot
		(v)	Put leaf on graph paper and draw around it ✓ Count the number of squares inside the leaf outline ✓	2	2 × 3.2a	 If no other marks awarded then allow for 1 mark measure height and width and multiply / find radius and use π x r^2 (to calculate area)

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	(b)		**First check the answer on the answer line** **If answer = 29 award 2 marks** Mean = 28 + 26 + 33 = 87 ✓ = 87 ÷ 3 = 29 ✓	**2**	 **2.2** **1.1**	 **ALLOW ECF** from incorrect addition **ALLOW** for two marks an answer of 27 if evidence seen that candidate has discounted 33 as an anomaly
	(c)	**(i)**	1.9 ✓	**1**	**3.1a**	**ALLOW** 1.8 – 2(.0)
		(ii)	Lower surface has more stomata than upper surface ✓ The more stomata, the higher/faster the transpiration rate ✓	**2**	**2 × 3.2b**	**IGNORE** directly proportional **IGNORE** numbers **ALLOW** more stomata means more/faster transpiration so more occurs on the lower leaf = 2 **ALLOW** lower surface has a higher/faster rate of transpiration because it has more stomata = 2 If no other marks awarded allow for 1 mark idea of lower surface transpiring more

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Question			Answer	Marks	AO element	Guidance
12	(a)		**First check the answer on the answer line** **If answer = 0.027 (mm) award 2 marks** Length = 15 (mm) ✓ Actual Size = 15 ÷ 550 = 0.027 (mm) ✓	**2**	**2 × 2.2**	**ALLOW** answer in range of 0.025–0.03 for 2 marks **ALLOW** length in the range 14–16 (mm) inclusive **ALLOW ECF** for correct evaluation from incorrect measurement **ALLOW** answer in range of 0.0025–0.003 = 1 **ALLOW** answers in standard form
	(b)		**Any one from:** Store genetic material/DNA ✓ Protect genetic material ✓	**1**	**1.1**	**ALLOW** controls the cell

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Question			Answer	Marks	AO element	Guidance
13	(a)		(A to B) as light intensity increases photosynthesis increases ✓ (From B to C) increasing light intensity has less effect / the rate of photosynthesis plateaus/levels off ✓ Light is the limiting factor A-B / there is another (named) limiting factor B-C ✓	3	2.2 2.2 2.1	**IGNORE** as photosynthesis increases light increases **ALLOW** the rate stops getting any faster **IGNORE** the graph reaches a plateau/levels off **DO NOT ALLOW** the rate of photosynthesis is slowing down/the rate decreases **ALLOW** (B-C) light intensity is no longer a limiting factor
	(b)		**Any two from:** Temperature **And** Using a water bath/ using a heat sink / using an LED bulb ✓ Carbon dioxide concentration **And** Using fresh water each time / dissolve same concentration of carbonate into water ✓ Genetics/species of plant/distribution of chloroplasts **And** Using the same (species) plant/cuttings from the same plant ✓	2	2 × 2.2	**Read through answer as whole and accept correct answer anywhere within response** **IGNORE** water as a variable

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						Additional marking points: **ALLOW** pond weed size/length/mass **And** Idea of comparing with another piece of pondweed / measuring the length with a ruler / mass with balance/scale **ALLOW** same size leaves **And** Using the same species / same age of pond weed / measure surface area of leaves **ALLOW** same number of leaves **And** Counting them

Question			Answer	Marks	AO element	Guidance
14	(a)		**Any three from:** Biological catalysts ✓ Lock and Key / (each enzyme has) specific substrate ✓ The active site (of the enzyme) is complementary (to the substrate) ✓ Forming an enzyme-substrate complex / substrate binds at active site ✓ Lowers the activation energy ✓	3	3 × 1.1	**ALLOW s**ubstrate matches with/fits into shape of active site **ALLOW** labelled diagrams which show the active site is complementary **ALLOW** 'ESC' as an acronym for enzyme substrate complex
	(b)		**Any three from:** At low temperatures there are fewer collisions / fewer enzyme substrate complexes ✓ There is a (optimum) temperature where the reaction rate is fastest/best ✓ At (too) high temperatures (higher than the optimum) the enzyme denatures/changes shape ✓ So the substrate no longer fits in the active site/active site is no longer complementary ✓	3	3 × 2.1	**ALLOW** as temperature increases enzymes have more frequent collisions / more enzyme substrate complexes **ALLOW** 'ESC' as an acronym for enzyme substrate complex **DO NOT ALLOW** if temperature is too low enzyme denatures

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						ALLOW as temperature increases rate of reaction increases until the enzyme becomes denatured for 2 marks for MP 1 and MP3
	(c)		**Any two from:** (Body temperature has become too cold during the night so need to warm up) so enzymes can work faster ✓ So respiration rate is higher/increases ✓ So that they can move faster / release more energy (to be active) / digest food quicker ✓	**2**	**2 × 2.1**	**ALLOW (**body temperature needs to increase) for the enzymes to have enough activity **ALLOW** (so that the body temperature) becomes the optimum temperature for the enzymes **ALLOW** need to warm up to speed up their metabolism **ALLOW** produce more ATP (to be active) **IGNORE** idea of gains energy from Sun **DO NOT ALLOW** produces energy

Question			Answer	Marks	AO element	Guidance
15	(a)		Wall is thick/muscular ✓ To generate high force/pressure✓ (As the left side) <u>pumps</u> blood to the body/further than the right side✓	3	1.1 2.1 2.1	**ALLOW** (left ventricle is) more muscular **IGNORE** valves **ALLOW** pumps blood with more force/pressure **IGNORE** can withstand high force/pressure
	(b)		**Any two from:** Large surface area to volume ratio ✓ Low metabolic rate ✓ Short diffusion distance ✓	2	2 × 2.1	 **ALLOW** idea of short diffusion distance e.g. reduces the travelling distance of particles **ALLOW** molecules can get to all the organism by diffusion/active transport/osmosis through cell membrane

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Question			Answer	Marks	AO element	Guidance
16	(a)		Motor neurones stimulate muscles✓ Receptors stimulate sensory neurones ✓	2	2 × 1.1	If three ticked and two correct = 1 mark If three ticked and one correct = 0
	(b)		(Low thyroxine levels) detected in the hypothalamus ✓ Hypothalamus releases TRH ✓ Pituitary releases TSH ✓	3	3 × 1.1	**DO NOT ACCEPT** hypothalamus releases TSH **DO NOT ACCEPT** pituitary releases TRH **Allow for 4th MP** TSH stimulates the release of thyroxine by the thyroid If no other marks awarded allow 1 mark for negative feedback system
	(c)		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)** Accurate identification of the hormones involved **and** a detailed explanation of how hormones in IVF work **AND** Detailed evaluation of the effectiveness of IVF (justified through drawing upon the data and own scientific knowledge) *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)**	6	3 × 1.1 3 × 3.1b	**To include:** **AO1.1: Demonstrate knowledge and understanding of female hormones and their function in IVF treatment:** • FSH and LH given to the mother • FSH/LH causes (a number of) eggs to mature • oestrogen/progesterone is given to support the uterus lining for implantation/maintain pregnancy

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			Some accuracy in naming the hormones involved **and** a correct explanation of how one of the named hormones in IVF work **AND** Some evaluation of the effectiveness of IVF (drawing upon the data and some own scientific knowledge) *There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.* **Level 1 (1–2 marks)** Identify one hormone with an attempt at a limited explanation of how that hormone works in IVF **OR** Limited evaluation of the effectiveness of IVF (at this level it can be a limited comparison) *There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant*. **0 marks** *No response or no response worthy of credit.*			**AO3.1b Analyse information and ideas to make judgements on the effectiveness of IVF:** • not suitable for all causes of infertility • can be very expensive/equity in treatments • low success rate in women over 40 • women over 40 have less eggs/poor quality eggs/closer to menopause/release fewer eggs • might be the only way a couple can conceive • ethical implications of not all embryos being used • eggs are frozen to be used for another attempt • emotional side effects of injecting hormones into females (mood swings/emotionally and physically stressful) • physical side effects (too many eggs developing at once can harm ovaries) • low risk procedure • can screen for genetic diseases

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Question			Answer	Marks	AO element	Guidance
17	(a)		Active transport ✓	1	1.1	
	(b)		**First check the answer on the answer line** **If answer = 28.1 (%) award 2 marks** ((4.1-3.2) ÷ 3.2) × 100 ✓ = 28.1(25) (%) ✓	2	2 × 2.2	**If nothing on answer line then check table, but answer line takes precedence**
	(c)		Water moves out of the cells (at 0.5 concentration) ✓ By osmosis ✓ As the solution is more concentrated/has lower water concentration/lower water potential (than the cells/chip/potato) **ORA** ✓	3	3 × 2.2	**ALLOW** water has moved out of the chip/potato **ALLOW** from a region of high water concentration to a region of low water concentration

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