Foundation

GCSE

Biology A Gateway

J247/01: Paper 1 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2024

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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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.

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.

7. Award No Response (NR) if:

- there is nothing written in the answer space

Award Zero '0' if:

- anything is written in the answer space and is not worthy of credit (this includes text and symbols).

Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

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.

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

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

Annotation	Meaning
I	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

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**.

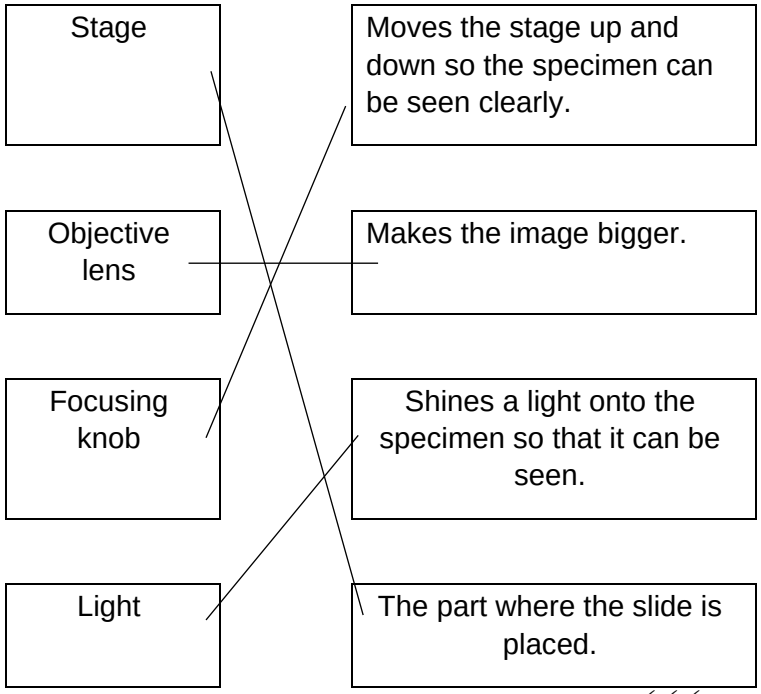
Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

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.

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	A	**1**	**1.1**	
2	D	**1**	**1.1**	
3	C	**1**	**2.1**	
4	C	**1**	**1.1**	
5	D	**1**	**1.1**	
6	C	**1**	**1.1**	
7	A	**1**	**1.1**	
8	D	**1**	**1.1**	
9	C	**1**	**1.1**	
10	B	**1**	**1.1**	
11	D	**1**	**1.1**	
12	C	**1**	**1.2**	
13	A	**1**	**2.1**	
14	D	**1**	**1.1**	
15	A	**1**	**1.1**	

Question			Answer	Marks	AO element	Guidance
16	(a)		 ✓✓✓	3	3 x 1.2	4 correct lines = 3 marks 3/2 correct lines = 2 marks 1 correct line = 1 mark **DO NOT ALLOW** more than 1 line for each statement
	(b)	(i)	**First check the answer on the answer line** **If answer = 40 award 2 marks** 400 ÷ 10 ✓ = 40 ✓	2	2 x 2.2	**IGNORE** units

Question			Answer	Marks	AO element	Guidance
		(ii)	**Any three from**: Use a (sharp) pencil ✓ Draw with continuous lines ✓ No shading ✓ No colour ✓ Consider proportion ✓ Labels ✓ Display the magnification ✓ Copy (image) ✓	3	3 x 1.2	**ALLOW** single lines **ALLOW** no dashes/sketchy lines **ALLOW** similar/same size/shape **ALLOW** key structures labelled **IGNORE** trace
	(c)		**ANY two from:** (Electron microscopes have) high magnification ✓ (Electron microscopes have) a high resolution ✓ Produces a 3D image ✓	2	2 x 1.1	Assume answer refers to electron microscope unless stated **ALLOW ORA** for light microscope for each reason **IGNORE** zoom

Question			Answer	Marks	AO element	Guidance
17	(a)		**Any 4 from:** (Aerobic) respiration ✓ Glucose (used) ✓ Oxygen (used) ✓ Carbon dioxide and water (made) ✓ When oxygen levels are low ✓ Anaerobic respiration (can also produce ATP) ✓ (Anaerobic respiration) produces lactic acid ✓	**4**	**4 x 1.1**	 **DO NOT ALLOW** aerobic respiration if lactic acid produced **DO NOT ALLOW** an incorrect reactant **DO NOT ALLOW** an incorrect reactant **DO NOT ALLOW** an incorrect product **DO NOT ALLOW** anaerobic respiration if oxygen is named as a reactant **DO NOT ALLOW** an incorrect product **ALLOW** glucose used in either aerobic or anaerobic respiration but only credit once **IGNORE** make/produce energy / mitochondria / oxygen debt

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td><table><tr><th>Response</th><th></th></tr><tr><td>Hairs stand up</td><td></td></tr><tr><td>Increases sweat production</td><td>✓</td></tr><tr><td>Shivering</td><td></td></tr><tr><td>Vasoconstriction of blood vessels</td><td></td></tr><tr><td>Vasodilation of blood vessels</td><td>✓</td></tr></table>✓✓</td><td>2</td><td>2 x 2.1</td><td>DO NOT ALLOW more than two ticks, each additional tick will negate a marking point.</td></tr>
<tr><td></td><td>(c)</td><td></td><td>Lactic acid ✓</td><td>1</td><td>2.1</td><td></td></tr>
<tr><td></td><td>(d)</td><td>(i)</td><td>13:00/1pm/o’clock ✓</td><td>1</td><td>3.1b</td><td>ALLOW any time/range between 12-1pm

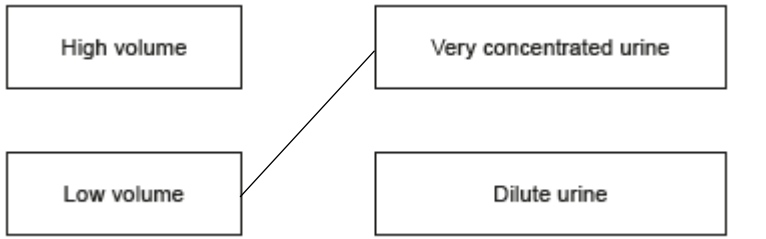
DO NOT ALLOW 12am</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Glucose (from food) ✓

PLUS

Pancreas (detects) ✓
OR
Increase insulin (levels) ✓</td><td>2</td><td>2.1

3.2a</td><td>Assume answer refers to insulin unless stated
ALLOW sugar
IGNORE carbohydrate
DO NOT ALLOW glucose from food decreases
DO NOT ALLOW other named nutrients

ALLOW produce insulin</td></tr>
</table>

Question			Answer	Marks	AO element	Guidance
	(e)		 ✓	1	2.1	**DO NOT ALLOW** more than one line drawn
	(f)		Y ✓ Random ✓	2	2 x 2.2	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td>18</td><td>(a)</td><td></td><td>
<table>
<tr><td>Reagent</td><td></td><td>Colour</td><td></td></tr>
<tr><td>Benedict’s</td><td></td><td>Black</td><td></td></tr>
<tr><td>Biuret</td><td>✓</td><td>Purple</td><td>✓</td></tr>
<tr><td>Iodine</td><td></td><td>Red</td><td></td></tr>
</table>
✓✓
</td><td>2</td><td>2 x 1.2</td><td>DO NOT ALLOW more than one tick in each column</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Idea oxygen to reach the chick / carbon dioxide produced by the chick to escape ✓</td><td>1</td><td>2.1</td><td>ALLOW chick can respire

IGNORE gases in and out / breathing</td></tr>
<tr><td></td><td>(c)</td><td></td><td>
<table>
<tr><td>C</td><td>D</td><td>E</td><td>A</td><td>B</td></tr>
</table>
✓✓
</td><td>2</td><td>2 x 1.1</td><td>D correct ✓
A before B ✓</td></tr>
<tr><td></td><td>(d)</td><td></td><td>2 (orders of magnitude) ✓</td><td>1</td><td>2.2</td><td></td></tr>
</table>

Question			Answer	Marks	AO element	Guidance
19	(a)		From the top in a clockwise direction: Receptor ✓ Sensory (neurone) ✓ Relay (neurone) ✓ Motor (neurone) ✓ Effector ✓	5	5 x 2.1	**DO NOT ALLOW** more than 1 answer in each box
	(b)		Positive ✓ 1.0 ✓ Faster ✓	3	3 x 3.2b	**DO NOT ALLOW** more than one option chosen for each marking point **ALLOW** 1
	(c)	(i)	Similarity: (They both) have a brain ✓ Difference: (Only the) human has a spinal cord **OR** Octopus does not have a spinal cord ✓	2	2 x 2.1	**ALLOW** eyes are close to the brain **IGNORE** spine alone

Question			Answer	Marks	AO element	Guidance
		(ii)	Idea the nerve impulses do not have far to travel / takes less time for information to reach the brain/CNS ✓	**1**	**2.1**	**ALLOW** idea of response/reactions will be faster/quicker/take less time **IGNORE** reflexes **IGNORE** reference to speed of nerve impulses/electrical signals **IGNORE** send information from brain to eye

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)** Explanation of when pregnancy is most likely to occur **AND** Explanation of when pregnancy could possibly occur using the information **AND** Justified using detailed information provided by the doctor, graph and scientific knowledge included. *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)** Explanation of when pregnancy is most likely to occur. **OR** Explanation of when pregnancy could possibly occur. **AND** Justified using some information provided by at least two from: doctor, graph and 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)** Basic explanation of when pregnancy is most likely to occur **OR** Basic explanation of when pregnancy could possibly occur.	**6**	**2 x 1.1 1 x 3.1a 3 x3.2a**	**AO1.1 Demonstrates knowledge and understanding of scientific ideas to explain hormonal control of ovulation.** • Ovulation is the release of the egg (from the ovary) • egg is released/ovulate when the hormone is high/middle of the cycle • LH is the hormone • LH stimulates ovulation **AO3.1a Interprets information from the graph to explain when ovulation occurs** • states that the hormone/LH is highest on day 13 • hormone/LH increases /peaks during middle of the cycle • ovulation/egg released on day 13 • accept annotation from the graph to demonstrate when hormones are increasing/middle of the cycle/peaks **AO3.2a Makes judgements on when sex could result/is most likely to result in pregnancy.** most likely get pregnant: • have sex around day 13 (allow range 11-14)/middle of the cycle (due to ovulation)

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td></td><td></td><td></td><td>AND
Justified using limited information provided by either the doctor, graph or scientific knowledge

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.</td><td></td><td></td><td>• pregnant from day 11/2 days before ovulation/egg released (because most sperm can survive for 2 days)

possibly get pregnant:
• have sex between days 8 to 14
• pregnant from day 8/five days before ovulation/egg released (because some sperm could survive for 5 days)
• pregnant up to day 14/ one day after ovulation/egg released (because egg can survive for 24hrs/1 day)</td></tr>
<tr><td></td><td>(b)</td><td></td><td>
<table>
<tr><th></th><th>Hormonal</th><th>Non - hormonal</th><th>Stops sperm entering the uterus</th><th>Stops ova (eggs) being released</th></tr>
<tr><td>Condom</td><td></td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Diaphragm</td><td></td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>IUD</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>Combined pill</td><td>✓</td><td></td><td></td><td>✓</td></tr>
</table>
✓✓✓✓</td><td>4</td><td>4 x 1.1</td><td>One mark for each correct row
ALLOW Hormonal and non-hormonal together for IUD, but not Hormonal on its own.</td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td>21</td><td>(a)</td><td></td><td>(Valves) stop the backflow of blood/ensure blood flows in one direction ✓</td><td>1</td><td>1.1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>Blood/pressure builds up (in the legs) ✓</td><td>1</td><td>2.1</td><td>ALLOW reduces blood flow (away from legs)
ALLOW blood flow backwards
IGNORE vein swells up</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>First check the answer on the answer line
If answer = 578 or 577.76 award 2 marks

$\frac{(1256 \times 46)}{100}$ ✓

= 578 / 577.76 ✓</td><td>2</td><td>2 x 2.2</td><td>ALLOW 577 / 577.8 for one mark</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>
<table>
<tr><th>Conclusion</th><th>True</th><th>False</th></tr>
<tr><td>More females than males develop varicose veins.</td><td>✓</td><td></td></tr>
<tr><td>Varicose veins are more common in people under the age of 25.</td><td></td><td>✓</td></tr>
<tr><td>The age range 50-54 has the greatest number of cases of varicose veins.</td><td></td><td>✓</td></tr>
<tr><td>There are almost double the number of people with varicose veins in the age range 55-59 compared to 65-69.</td><td>✓</td><td></td></tr>
</table>
✓✓
</td><td>2</td><td>2 x 3.2b</td><td>All correct = 2 marks
Two or three correct = 1 mark
One correct = 0 marks

DO NOT ALLOW more than 1 tick for each row.</td></tr>
</table>

Question			Answer	Marks	AO element	Guidance
	(d)		**Any one from:** (To see if other scientists) can replicate/reproduce/further develop the work ✓ To check/prove the method/data/results/mistakes ✓ To uphold standards / prevent unethical practice/bias ✓ Recognition of work ✓	**1**	**2.1**	**ALLOW** comment/feedback on work/identify mistakes/misinformation **IGNORE** share views **DO NOT ALLOW** accurate results/anomalies **ALLOW** can see the value of the research

Question			Answer	Marks	AO element	Guidance
22	(a)		**Any three from:** Use a (measuring) balance ✓ Measure the mass of the beetroot cube at the start of the experiment ✓ Measure the mass of the beetroot cube at the end of the experiment ✓ Reference to blotting/drying the outside of the cubes ✓	**3**	**3 x 3.3a**	 **ALLOW** use scales **ALLOW** weight for mass **ALLOW** weight for mass **IGNORE** any references to measuring concentrations/volumes or making the cubes the same mass **ALLOW** one mark for simply measuring the mass/weight of the cubes, if no other mark scored
	(b)		**Any two from:** Beetroot cubes come from the same plant ✓ Volume of the solution ✓ Ensure the cubes are submerged ✓ Temperature (of the solution) ✓ Size/surface area/volume of cubes ✓ Time (in the solution) ✓ Type of sugar ✓	**2**	**2 x 2.2**	 **ALLOW** same type/variety/species of beetroot **IGNORE** amount of solution/how much solution **IGNORE** mass of cubes

Question			Answer	Marks	AO element	Guidance
	(c)		**Any three from:** *Repeatable:* (The student/they should) repeat the experiment/take repeat readings ✓ *Reproducible:* Another student/person conducts the experiment ✓ Use different equipment / use a different method ✓ *In either section once only:* To see if the results are the same/similar / make sure there are no anomalies ✓	**3**	**3 x 2.2**	**Maximum two marks awarded in each section** **ALLOW** use a different beetroot **IGNORE** compare the results **ALLOW** reference to small range bars being more repeatable
	(d)		**Any two from:** Water moves in (to the beetroot/cubes/cells) ✓ By <u>osmosis</u> ✓ The solution/outside the beetroot has a low<u>er</u> concentration (than inside the beetroot) **ORA** ✓	**2**	**2 x 2.1**	**DO NOT ALLOW** sugar solution moves in by osmosis **ALLOW** sugar solution has a higher/less negative water potential (than the beetroot tissue/cells) **ORA** **ALLOW** The solution/outside the beetroot is more dilute **ORA**

Question			Answer	Marks	AO element	Guidance
						ALLOW correct references to concentration of water / water moving down its concentration gradient

Question			Answer	Marks	AO element	Guidance
23	**(a)**	**(i)**	Embryonic (stem cell) ✓	**1**	**2.1**	**ALLOW** embryo stem cells
		(ii)	Can differentiate into any type of cell✓	**1**	**2.1**	
	(b)	**(i)**	46% improvement is not a cure / 46% is not a large improvement / hearing is not fully restored ✓ These results are only after 10 weeks / may not be a long-term cure / have not observed long term effects ✓ Only 18 rodents were used / not a large sample size ✓ Idea that an improvement of 46% on average means some may have less than 46% improvement ✓ Only tested on rodents / results in humans might be different ✓	**3**	**3 x 3.2a**	**ALLOW** answers referring to **only** 46% hearing restored / 46% is not very high / less than half of their hearing was regained **DO NOT ALLOW** only 46%/less than half have been cured/regained hearing
		(ii)	Test the procedure on more rodents / Monitor the rodents hearing for longer /	**1**	**3.3b**	

Question			Answer	Marks	AO element	Guidance
			Try a different number/more nerve cell transfers / Use different type of stem cells / Try the technique on more species/humans ✓			**IGNORE** reference to making deaf in two ears
	(c)		**First check the answer on the answer line** **If answer = 1.5 award 2 marks** 10 x 0.15 **OR** 15/100 x 10 ✓ = 1.5 ✓	**2**	**2 x 2.2**	**ALLOW** any correct calculating method **ALLOW** 1 500 000 on the answer line for one mark max

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