OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



MARK SCHEME

B2.1 SUPPLYING THE CELL

SCORE	PERCENTAGE
/113	%

STEMUP

These questions belong to OCR, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by OCR. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with OCR and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. OCR has not endorsed, approved or been involved in the production of it. OCR and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

OCR publishes its past papers, mark schemes and examiner reports. Always check the current specification at ocr.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Question			Answer/Indicative content	Marks	Guidance
1	a		osmosis (1)	1	
	b		absorbed water (1) Higher water potential / water concentration outside ORA (1)	1 1	**allow** (movement) from higher to lower water potential / from higher to low water concentration
	c		(potato has) same water potential / water concentration (as solution) (1) no (net) water loss or gain (1)	1 1	
			Total	**5**	
2		i	6:1	1	
		ii	7.6×10^{-3} 3.0×10^{-3} 1.5×10^{-3} correct calculation of 1 / time (1) ii answer in standard form (1)	1 1	
		iii	Comment on the rate of colour change / smaller block changed faster (1) iii Diffusion alone is sufficient in smaller organisms / smaller organisms have a larger surface area to volume ratio / diffusion alone may not be effective in multi cellular organisms (may require circulatory system) (1)	1 1	**ORA**
			Total	**5**	
3			all genetically identical / all have the same genes (1)	1	all clones (1)
			Total	**1**	
4			B	1	
			Total	**1**	
5	a		absorbed water (1) higher water potential / water concentration outside ora (1)	1 1	**allow** (movement) from higher to lower water potential / from higher to low water concentration

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
	b		(potato has) same water potential / water concentration (as solution) (1) no (net) water loss or gain (1)	1 1	
	c	i	–10 (%) (2) but 10 (%) (1)	2	
		ii	can still compare even if original sizes are different (1)	1	
	d	i	ignores changes to width (1)	1	
		ii	measure (changes to) volume / mass (1)	1	
			Total	9	
6		i	any higher and the bacteria might be killed / bacterial enzymes denatured (1)	1	**allow** optimum temperature for the bacteria / bacterial enzymes
		i	any lower and the erythromycin would diffuse slower / bacteria would reproduce more slowly so takes longer to get the results (1)	1	**allow** spread out slower
		ii	prevent contamination by other microbes (1)	1	**not** germs / bugs
			Total	3	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
7			(cells) have partially permeable membrane (1) potato / cells are more concentrated than the distilled water (1)	2	**allow** semi-permeable membrane answer must be comparative **allow** cells have lower water concentration (than distilled water) **allow** correct ref. to concentration gradient **allow** higher level answers relating to water potential assume unqualified references to concentration refer to solute e.g. water moves from high to low concentration = 0 but water moves from high water concentration to low water concentration = 1 Examiner's Comments The common weakness in answers was to make unqualified references to concentration. To say that water would move from an area of high water concentration to an area of low water concentration would have gained a mark. However to say that water would move from a high concentration solution to a low concentration solution would not. Unqualified references to concentration were taken by markers to refer to solute concentration. The second mark was for reference to a partially permeable membrane. 'Semi-permeable membrane' was acceptable, but 'partially permeable wall' was not. Neither was 'permeable membrane'.
			Total	2	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
8		i	**any two from:** has a nucleus ora (1) has mitochondria ora (1) has chloroplasts ora (1)	2	**not** cell wall **not** cytoplasm **not** cap
		ii	some genes can be lost from some cells: ; both aerobic and anaerobic respiration can occur: ; cells are able to differentiate and specialise: ✓ ; organisms are able to clone themselves:	1	more than one answer = 0
		iii	nervous or hormone system to communicate between cells / transport or circulation or cardiovascular system to carry nutrients / oxygen / blood / CO_2 around the organism excretory or gas exchange system to exchange materials with the surroundings (1)	1	**ignore** named organs e.g. kidney / heart etc. for system **allow** explained alternative systems e.g. respiratory system / reproductive / digestive
			Total	**4**	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
9			[Level 3] Explain the results in terms of direction of water movement **AND** differences in concentration between the liquid and the cells. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) [Level 2] Explain the results in terms of direction of water movement without referring to differences in concentration. **Or** gives a complete explanation for one tube only Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] States that water is moving in or out of the cells without reference to the correct direction **OR** links the idea of osmosis to water movement. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0marks)	6	This question is targeted at grades up to C Indicative scientific points at Level 3 may include: • tube A - cells burst because water moves in (by osmosis) from an area of higher water concentration • tube B - cells shrink because water moves out (by osmosis) because the there is a higher water concentration inside the cells Indicative scientific points at Level 2 may include: • tube A - cells burst because water moves in (by osmosis) • tube B- cells shrink because water moves out (by osmosis) Indicative scientific points at Level 1 may include: • water moves into the cells • water moves out of the cells • water caused the cell to burst / shrink • osmosis is the movement of water (across a partially-permeable membrane) • when cells burst makes the liquid go clear If reference to salt solution moving out of red blood cells then answer is limited to level 1 Use the L1, L2, L3 annotations in Scoris; do not use ticks.
			Total	6	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
10			[Level 3] States the effects are due to osmosis AND Explain the results in terms of direction of movement AND uses the terms lysis and crenation correctly Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) [Level 2] States the effects are due to osmosis **and** attempts to explain the results in terms of direction of movement OR States the effects are due to osmosis **and** uses the terms lysis **and** crenation correctly Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) [Level 1] States the effects are due to osmosis. OR uses the terms lysis **or** crenation correctly Quality of written communication impedes communication of the science at this level. (1 – 2 marks) [Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0marks)	6	This question is targeted at grades up to A* Indicative scientific points at that may be include: • effects are due to osmosis • at low concentrations / cells burst / liquid goes clear due to **lysis / haemolysis** **not turgid** • high concentrations / cells shrivel / liquids remain cloudy due to **crenation** **not plasmolysis / flaccid** direction of movement • at low concentrations / cells burst / liquid goes clear because water moves into cells when **salt** concentration of solution is **lower** (than **salt** concentration inside cells) **or** at low concentrations / cells burst / liquid goes clear because water moves into cells when **water** concentration of solution is **higher** (than **water** concentration inside cells) **or** at low concentrations / cells burst / liquid goes clear because water moves into cells when solution is **hypotonic** • at high concentrations / cells do not burst / liquid stays cloudy because water moves out of cells when **salt** concentration of solution is **higher** (than **salt** concentration inside cells) or at high concentrations / cells do not burst / liquid stays cloudy because water moves out of cells when **water** concentration of solution is **lower** (than **water** concentration inside cells) or at high concentrations / cells do not burst / liquid stays cloudy because water moves out of cells when solution is **hypertonic** **allow** reverse arguments for each direction of movement

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
					Use the L1, L2, L3 annotations in Scoris; do not use ticks.
			Total	6	
11			C ✓	1 (AO 2.1)	
			Total	1	
12			D ✓	1 (AO 1.2)	Examiner's Comments Very few candidates were aware of the reasons for active transport on this recall question. Many opted for 'A'. Others that had more of an awareness that concentration was involved chose the high concentrations, clearly unsure about the reason why active transport is needed.
			Total	1	
13			B ✓	1 (AO 2.1)	
			Total	1	
14			C ✓	1 (AO1.1)	
			Total	1	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
15		i	idea that stem cells are not differentiated / can still specialised✓ they can replace damaged cells / develop into/change/divide/become retina cells ✓	2 (AO 1.2)	ALLOW stem cells are unspecialised / can differentiate/grow into any (type of) cell ALLOW can differentiate/specialise into retina cells = 2 marks IGNORE can repair retina Examiner's Comments There were some good examples demonstrating their knowledge and understanding of stem cells in this answer. Most common non-credited answers were just repeating the question that they can repair the retina but not describing how. Exemplar 6 gained full marks. Exemplar 6 Why might stem cells be able to repair the retina? stem cells are undifferentiated cells meaning they can be modified to do anything. So scientists are able to modify stem cells to replace the faulty cells in the retina. [2]
		ii	any two from: to see if it works ✓ make sure it is safe / identify side effects✓ to find the correct dosage✓	2 (AO 1.2)	ALLOW see results ALLOW could go wrong / unknown effect IGNORE can't test on humans Examiner's Comments The vast majority of candidates scored at least 1 mark here for side effects / make sure it is safe. The least scored marking point was to find the correct dosage.
			Total	4	
16			C ✓	1 (AO 1.1)	
			Total	1	

Question			Answer/Indicative content	Marks	Guidance
17			D ✓	1 (AO 1.2)	
			Total	1	
18			B ✓	1 (AO 1.1)	
			Total	1	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
19		i	photosynthesis makes sugars in guard cells ✓ epidermal cells (dont photosynthesise so) lower in sugar than guard cell ✓ **and any two from:** epidermal cells higher osmotic / water potential than guard cells ✓ ORA water enters guard cells (by osmosis) ✓ ORA increasing turgidity of guard cell opens stomata ✓ ORA due to thicker inner cell wall ✓ opening / size of stoma affects transpiration rate ✓	4 (AO 2 × 1.1) (AO 2 × 2.1)	**ALLOW** correct description of transpiration linked to the size of stoma Examiner's Comments Candidates found this question one of the most challenging on the paper. Few candidates demonstrated a good knowledge of the mechanism of stomatal opening. Many candidates seemed to reverse the question and tried to explain how the rate of transpiration controlled photosynthesis in guard cells.
		ii	they have differentiated ✓ have a **specific** job to do (in the leaf/plant) ✓	2 (AO 2 × 1.1)	**ALLOW** they have adapted (to their function) **ALLOW** no other cells do the same job **ALLOW** they can open / close stomata they have adapted to a **specific** job / they are adapted to open and close stomata = 2 marks Examiner's Comments There were some good answers focussing on the structural differentiation of guard cells and the fact that they have a specific role.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

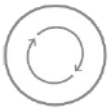
Question			Answer/Indicative content	Marks	Guidance
			Total	6	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
20		i	(skin stem cell) differentiates into (motor) neurone ✓	1 (AO 2.2)	ALLOW differentiates into MN (taken from abbreviation of motor neurone disease to MND in stem of question) Examiner's Comments This question was referring to the ability of stem cells to be able to produce nerve cells that could be used to measure the speed of impulses. Most candidates did not refer to nerve cells in their answers. This is shown in exemplar 6, which gained 1 mark. Exemplar 6 Stem cells are undifferentiated [1]
		ii	cerebru ✓ idea that area of brain controlling motor function / movement / conscious activities ✓	2 (AO 1.1) (AO 2.1)	ALLOW cerebral cortex / motor cortex IGNORE it is the area that coordinates reactions. DO NOT ALLOW a list of correct functions of the cerebrum without the importance of movement being highlighted Examiner's Comments The region labelled Y was correctly identified by many candidates, although there was some confusion with the cerebellum. The explanation did not always gain marks, as many candidates simply listed all the functions of the cerebrum.
		iii	Any two from: difficult to access brain (due to skull) ✓ large number of neurones / large number of nerve impulses in the brain/ difficult to follow a single neurone ✓ ethical issues of researching on brain / risk of damage ✓	1 (AO 2 × 2.2)	IGNORE difficult to take measurements in brain unless qualified Examiner's Comments There were many correct references to the difficulty of access to the brain and the risk of damage. Some candidates incorrectly referred to differences in conduction velocities in the two types of cell.
			Total	5	

Question			Answer/Indicative content	Marks	Guidance
21		i	stem cells are not differentiated/can still specialise ✓ they could become rod cells ✓	1 (AO 1.2) 1 (AO 2.1)	ALLOW stem cells are unspecialised / can grow into any type of cell / have ability to differentiate Examiner's Comments Most candidates were able to describe what a stem cell is assessing AO1.1, and many had the AO2.1 idea that they could become rod cells. Some missed the AO2.1 mark by referring to damaged or mutated cells, instead of the rod cells.
		ii	idea it would not be detected as foreign cells (by the immune system/WBC) ✓ OR idea it would not be rejected (by the body) ✓	1 (AO2.2)	ALLOW accepted (by the body) / (body) more likely to accept Examiner's Comments This AO2 question was generally answered well. Lower ability candidates stated that stem cells from another person "wouldn't work". Marks are scored more frequently when candidates avoid general terms, and responses are specific to the question asked.
			Total	3	
22			A	1 (AO 1.1)	Examiner's Comments  AfL There were occasionally some candidates who had 'No Response' answers which could be easily overcome through developing examination technique. Candidates should also be discouraged from choosing numbers from the set of alternatives and entering this in their answer box, rather than the letter of the alternative they think is correct.
			Total	1	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
23			B	1 (AO 1.1)	<u>Examiner's Comments</u> This is an AO1.1 question testing recall of transport in and out of cells. In general, candidates chose either A or B. Only candidates who performed well overall chose the correct answer B.
			Total	1	
24			A	1 (AO 1.1)	
			Total	1	
25			C	1 (AO 2.2)	<u>Examiner's Comments</u> This is an AO2.2 question testing the ability to apply knowledge of osmosis to changes in volume, and was well answered by many candidates. Candidates clearly understood there would be no change in volume if put in the same sucrose concentration.
			Total	1	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
26	a	i	**Any one from:** provides a fine/clean cut ✓ for more accurate/precise cutting measurement ✓	1 (AO 2.2)	**ALLOW** scalpel is sharper **ALLOW** easier to cut with scalpel **IGNORE** more hygienic Examiner's Comments Most candidates scored this AO2.2 mark, many correctly referring to precision or sharpness. However, several responses identified a concern about contamination with a kitchen knife and this was not appropriate in the context of the stem of the question so did not gain credit.
		ii	cut in a direction away from yourself / where possible cut using a cutting board ✓	1 (AO 2.2)	**ALLOW** place cover over scalpel if not in use **ALLOW** idea of keep fingers away from cutting/sharp edge/blade **IGNORE** safety gloves Examiner's Comments Again, many candidates scored this AO2.2 mark, with many correctly referring cutting away from yourself or, in some cases, keeping fingers away from the blade. However, several responses identified wanting to wear gloves, goggles etc and these were not accepted for correct responses. Some also wrote about being sensible, careful or responsible with the scalpel but not how to do that, so did not gain credit.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
		iii	No roots to take up minerals/water ✓ No shoots so no photosynthesis/sugars ✓	2 (AO 2 x 2.2)	ALLOW (cells absorb) sugars for respiration/energy ALLOW to provide water/sugar/minerals/nutrients scores 1 mark if no other mark Examiner's Comments AfL In this AO2.2 question the most common response was about being able to see the explants clearly or preventing contamination and very few candidates referred to the words in the question explaining there were no roots or leaves. Candidates should be encouraged to highlight, key words or phrases that might be important to consider in their responses. Most candidates who scored got the 1 mark for the allow in the guidance column of the mark scheme. It was very rare that any candidate scored 2 marks.
	b	i	warmth needed for (chemical) reactions / respiration / photosynthesis / growth ✓ light for photosynthesis / chlorophyll produced ✓	2 (AO 2 x 2.1)	ALLOW warmth speeds up metabolism/enzymes/mitosis/reproduction IGNORE bacteria ALLOW light/sunlight so plant can make sugar IGNORE Sun Examiner's Comments This AO2.1 question mainly gained marks from candidates who referred to warm conditions speeding up growth. Few mentioned light, and even fewer were able to link the light to photosynthesis.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
		ii	temperature can be controlled / kept at optimum temperature ✓ idea that light can be provided 24 hours / continuous light source ✓	2 (AO 3.3a)	ALLOW keeps constant temperature IGNORE keep heat constant ALLOW idea that air movement is constant ALLOW may go dark at night near window / avoids night-time conditions / avoids sunlight variability AW Examiner's Comments Candidates were able to identify that this AO3.3a question as developing an experiment by introducing an element of control. Where candidates only scored 1 mark it was usually for the idea of controlling the light by allowing continuous light. Some candidates did not score the first marking point as they were describing controlling heat rather than temperature, which was not given.
		iii	leaf cells / cells producing stems / chlorophyll being produced ✓	2 (AO 3.2a)	ALLOW explants are making chloroplasts / able to photosynthesise Examiner's Comments This AO3 question proved quite challenging but candidates who did gain credit usually gained the mark for recognition of photosynthesis, with fewer identifying that chlorophyll would be present. There were a significant number of candidates who wrote about growth of mould.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
	c		FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 86.7 (%) award 3 marks 13 ÷ 15 ✓ = 86.666666... (%) ✓ = 86.7 (%) (1 decimal place) ✓	3 (AO 2 x 2.2) (AO 1.2)	**ALLOW** 86.6 (recurring) **ALLOW** ECF for % calculation if incorrect substitution of values from question **ALLOW** ECF for answer given to 1 decimal place <u>Examiner's Comments</u> This question covering AO1.2 and AO2.2 was challenging. Some common errors included not using a calculator but rather using an estimation method leading to inaccurate responses and also not working out the change in mass. A significant number of those who correctly completed the calculation did not round it correctly, giving 86.6 as their answer or commonly 86.6 recurring. **Exemplar 1** Give your answer to 1 decimal place. 28 - 15 = 13 $\frac{13}{28} \times 100 = 46.42$ Percentage increase = 46.4 % [3] **AfL** In this exemplar, ECF was applied to the percentage calculation with incorrect value (though numbers are linked to the question), then correct rounding was done by the candidate. This highlights how important it is for candidates to show their working out as the candidate would not have scored any marks if all they had put was 46.4 on the answer line, as it would not have been possible to apply ECF.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
	d		plant/cauliflower cells can differentiate into any cell/become specialised (and make a new individual) ✓ the type of cell adult stem cells can differentiate into is limited / adult stem cells are difficult to obtain ✓	2 (AO 2.1)	If not specified assume answer refers to adult animals ALLOW embryonic cells can differentiate into any cell and make a new individual ALLOW adult animals no longer have embryonic (stem) cells ALLOW animals cells cannot differentiate into any cell ALLOW higher level answers relating to cloning techniques e.g. animal cells with no cell wall so osmotic medium needs balancing precisely to avoid cells bursting Examiner's Comments This AO2.1 question found candidates having considerable difficulty in applying their knowledge and understanding of stem cells. Most concentrated on the idea of animals being larger or more developed or advanced than cauliflowers. Others discussed ethics and only higher ability candidates were writing about differences in ability to differentiate in their responses.
			Total	14	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
27			**Any three from:** mitosis ✓ DNA replicates ✓ chromosomes separate ✓ cells divide into two new cells ✓ cells grow ✓	3 (AO 1.1)	**ALLOW** chromosomes are copied **ALLOW** DNA duplicates/doubles **ALLOW** (identical) daughter cells produced each with own copy of chromosomes **ALLOW** cell splits into two <u>Examiner's Comments</u> A large number of candidates found this AO1.1 question about cell division challenging and did not identify it as asking about how new cells are made, so did not make the link to cell division. Many described how the menstrual cycle was controlled by hormones and how they affected the thickness of the lining. There were some very good responses from those candidates that recognised this was about cell division but some mentioned meiosis rather than mitosis.
			Total	3	
28			D	1 (AO 1.1)	
			Total	1	
29			plants receive less light (for photosynthesis) / salt water/concentration affects osmosis / water is drawn out of the plants ✓	1 (AO 2.1)	<u>Examiner's Comments</u> Candidates found this question one of the most challenging on the paper. Few candidates could apply their knowledge of salt water on osmosis in plant cells or light on photosynthesis. Exemplar 1 demonstrates a common response which did not score. **Exemplar 1** Suggest **one** reason why salt marshes are difficult places for plants to grow. When the ~~water~~ tide comes in, the plants would be submerged in water and may drownd. [1]
			Total	1	

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
30			C	1 (AO 2.2)	
			Total	1	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
31	a		iodine (molecules) moved into bag / through membrane ✓ starch (molecules) cannot move through membrane / out of the bag ✓ starch molecule are large / iodine molecule are small / starch molecules larger than iodine / ORA ✓	3 (AO 2 x 3.2a) (AO 2.1)	ALLOW iodine moved into starch solution DO NOT ALLOW iodine moved by osmosis through membrane ALLOW starch cannot diffuse through membrane DO NOT ALLOW starch cannot move by osmosis through membrane ALLOW iodine smaller than pores in membrane/ORA✓ Examiner's Comments Many of the candidates understood that the iodine molecules must have entered the bag. However, some of them put this down to osmosis rather than diffusion and therefore lost this mark. Few candidates commented on the fact that starch molecules could not leave the bag and did not explain this in terms of the size of the molecules.
	b	i	suitable best-fit curve ✓	1 (AO 2.2)	DO NOT ALLOW obvious double lines or lines drawn with ruler Examiner's Comments The ability of candidates to draw a best fit curve seems to be improving and less double lines or sketched lines were seen.
		ii	answer should match where curve of best fit crosses X axis on candidates own line of best fit	1 (AO 3.2a)	ALLOW +- half a small square ie +- 0.02 from intercept on candidates graph Examiner's Comments Some candidates had difficulties with the scale, but most could read off the intercept.
		iii	0.6 (mol/dm^3) ✓	1 (AO 2.2)	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
	c		meristem ✓	2 (AO 1.1)	**ALLOW** cambium Examiner's Comments Although some of the spellings varied, a number of candidates correctly identified meristems.
			Total	**7**	
32			embryonic stem cells are able to differentiate into any cell / totipotent / adult stem cells are limited / pluripotent ✓ **therefore insulin producing cells** are easier to develop from embryonic stem cells/adult stem cells are not ✓	2 (AO 1.1) (AO 2.1)	**IGNORE** adult stem cells are already specialised **ALLOW** difficult to locate adult stem cells **IGNORE** embryonic stem cells can repair all parts Examiner's Comments The majority of candidates correctly explained the totipotent nature of embryonic stem cells but few candidates went on to explain the consequences of this in replacing pancreatic cells. Exemplar 6 shows an example of a common answer that only scores the first marking point. **Exemplar 6** embryonic stem cells can specialise to become any type of cell whereas adult stem cells can only specialise to become a cell from their own tissue [2]
			Total	**2**	

Question			Answer/Indicative content	Marks	Guidance
33	a		digital balance/scales / electronic balance/scales ✓	1 (AO 1.2)	ALLOW analytical balance/scales / scientific balance/scales ✓ IGNORE balance/scales unqualified / sensitive scales Examiner's Comments Many candidates did not concentrate on the accuracy needed and just stated 'a mass balance'.
	b	i	no chloroplasts / no chlorophyll / no leaves ✓ they cannot photosynthesise ✓	2 (AO 2 x 2.1)	DO NOT ALLOW chlorophyll removed by alcohol no chlorophyll/chloroplasts/leaves to allow photosynthesis = 2 marks Examiner's Comments There were many good answers seen here, with candidates linking the inability to photosynthesise to the absence of leaves or chlorophyll.
		ii	Any two from: include a thermostat ✓ keep the temperature constant/at optimum ✓ control the humidity ✓ circulate air inside the cabinet / keep well ventilated / give a supply of carbon dioxide ✓	2 (AO 3.3a)	IGNORE include insulation ALLOW increase humidity/water vapour IGNORE water the plants ALLOW give a supply of oxygen Examiner's Comments A common improvement was suggesting the provision of extra carbon dioxide, but a number of candidates concentrated on the heating or lighting rather than exploring 'further improvements'.
			Total	5	
34			C ✓	1 (AO1.1)	
			Total	1	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Question			Answer/Indicative content	Marks	Guidance
35			D ✓	1 (AO1.1)	
			Total	**1**	
36			A ✓	1 (AO1.1)	
			Total	**1**	
37			mitosis ✓	1 (AO1.1)	
			Total	**1**	
38			B ✓	1 (AO1.1)	
			Total	**1**	
39			B ✓	1 (AO1.1)	
			Total	**1**	
40			C ✓	1 (AO2.1)	
			Total	**1**	
41			A ✓	1 (AO2.1)	
			Total	**1**	

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK