Mark Scheme (Results)

Summer 2018

Pearson Edexcel GCSE
In Biology (1SC0) paper 2BH
Paper 2: Biology 2

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Mark schemes have been developed so that the rubrics of each mark scheme reflects the characteristics of the skills within the AO being targeted and the requirements of the command word. So for example the command word 'Explain' requires an identification of a point and then reasoning/justification of the point.

Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of the marking points that is needed to gain full marks.

When marking questions with a 'describe' or 'explain' command word, the detailed marking guidance below should be consulted to ensure consistency of marking.

Assessment Objective		**Command Word**	
Strand	**Element**	**Describe**	**Explain**
AO1*		An answer that combines the marking points to provide a logical description	An explanation that links identification of a point with reasoning/justification(s) as required
AO2		An answer that combines the marking points to provide a logical description, showing application of knowledge and understanding	An explanation that links identification of a point (by applying knowledge) with reasoning/justification (application of understanding)
AO3	1a and 1b	An answer that combines points of interpretation/evaluation to provide a logical description	
AO3	2a and 2b		An explanation that combines identification via a judgment to reach a conclusion via justification/reasoning
AO3	3a	An answer that combines the marking points to provide a logical description of the plan/method/experiment	
AO3	3b		An explanation that combines identifying an improvement of the experimental procedure with a linked justification/reasoning

*there will be situations where an AO1 question will include elements of recall of knowledge directly from the specification (up to a maximum of 15%). These will be identified by an asterisk in the mark scheme.

Question number	Answer	Mark
1(a)i	C a cell wall **1. The only correct answer is C** ***A*** *is not correct because both plant and animal cells have cytoplasm* ***B*** *is not correct because both plant and animal cells have a cell membrane* ***D*** *is not correct because both plant and animal cells have mitochondria*	**(1)** AO 1 1

Question number	Answer	Additional guidance	Mark
1(a)ii	Substitution 20.5 x 400 (1) Evaluation 8 200 (µm)	2 marks for correct answer with no working	**(2)** AO 1 2

Question number	Answer	Additional guidance	Mark
1(a)iii	Substitution (3.08 ÷ 400) = 0.0077 (1) Evaluation 7.7 x 10^{-3}	Award full marks for correct answer with no working accept 0.008 accept 8.0 x 10^{-3}	**(2)** AO 2 2

Question number	Answer	Additional guidance	Mark
1(b)(i)	An answer that combines **three** of the following points to provide a method: • measure the length of the tissue (1) • add masses / mass (1) • remove the mass and measure length of the tissue (1) • repeat until the tissue no longer returns to its original length (1)	accept remove the mass and see if the tissue returns to its original size	**(3)** AO 3 3a

Question number	Answer	Additional guidance	Mark
1(b)(ii)	Any one from: • wash hands (1) • wear gloves (1) • sterilise the apparatus after use / disinfect working area (1)	ignore standard lab rules accept cover open wounds	**(1)** AO 2 2

Total for Question 1 = 9 marks

Question number	Answer	Additional guidance	Mark
2(a)(i)	Any one from: • keep leaf peel flat (1) • keep leaf peel in place (1) • protect the (objective) lens (1) • protect the specimen (1)	ignore to prevent drying out	**(1)** AO 2 2

Question number	Answer	Additional guidance	Mark
2(a)(ii)	An explanation linking **two** of the following: • the leaf peel is thin / leaf is too thick (1) • as the leaf peel allows light to pass through it/the leaf would not allow light to shine through it (1) • to enable the {stomata / cells/ guard cells} to be identified (1)	 accept leaf would be opaque accept to see stomata / cells	**(2)** AO 2 2

Question number	Answer	Additional guidance	Mark
2(b)(i)	3 / three		**(1)** AO 2 2

Question number	Answer	Additional guidance	Mark
2(b)(ii)	A description including **three** of the following points: • guard cells (1) • take in water (1) • by osmosis (1) • (guard cells) become turgid/change shape/swell (1)	accept uneven thickness of guard cell walls leads to bulging	**(3)** AO 1 1

Question number	Answer	Additional guidance	Mark
2(b)(iii)	A explanation linking **two** of the following points: • no stomata (in the upper surface) to reduce water loss (1) • water loss during transpiration / evaporation (1) OR • stomata (on the lower surface) allow gas exchange (1) • gas exchange is needed for photosynthesis (1)	accept stomata (on the lower surface) {allow / reduce} water loss accept more water loss if stomata on top accept the idea of movement of oxygen or carbon dioxide for gas exchange	**(2)** AO 2 1

Total for Question 2 = 9 marks

Question number	Answer	Additional guidance	Mark
3(a)	A description including the following: • the blood flow through the {brain/other organs} stays the same (1) • the blood flow through the {muscles /heart} is increased during exercise (1) • the blood flow through the digestive system is decreased during exercise (1)	accept the blood flow through the brain decreases a small amount	**(3)** AO 3 1a AO 3 1b

Question number	Answer	Additional guidance	Mark
3(b)	An explanation that links **two** of the following: • there is increased blood flow to the muscles (1) • to allow for { respiration/ release of energy} (in the muscles) (1)	accept heart for muscle accept there is a {reduced /restricted} blood flow through the digestive system accept to supply oxygen/glucose to the muscles/remove carbon dioxide	**(2)** AO 2 1

Question number	Answer	Mark
3(c)	B left ventricle **1. The only correct answer is B** ***A*** *is not correct because the left atrium receives blood from the pulmonary vein* ***C*** *is not correct because The right atrium receives blood from the vena cava* ***D*** *is not correct because the right ventricle has deoxygenated blood*	**(1)** AO 1 1

Question number	Answer	Additional guidance	Mark
3(d)	Substitution 4.9 ÷ 0.07 / 4 900 ÷ 70 (1) Evaluation 70 (beats per minute)	full marks for correct answer no working accept 4.9 ÷ 70 = 0.07 for 1 mark	**(2)** AO 1 2

Total for Question 3 = 8 marks

Question number	Answer		Mark
4(a)(i)	• set up the apparatus as shown in Figure 6 (1) • replace the nitrate solution with (distilled) water / do not add nitrate pellet (1)	accept set up with a seedling on the cotton wool ignore just idea of controlling the volume of solution	**(2)** AO 2 2

Question number	Answer	Mark
4(a)(ii)	B oxidising **1. The only correct answer is B** ***A*** *is not correct because this is not the symbol for flammable* ***C*** *is not correct because the symbol for corrosive is a hand with acid* ***D*** *is not correct because the symbol for explosive has an explosion on it*	**(1)** AO 1 1

Question number	Answer	Additional guidance	Mark
4(a)(iii)	measure the (change in) mass (1)	accept idea of looking at the number/size of leaves accept the width of the seedling	**(1)** AO 3 3b

Question number	Answer		Mark
4(b)(i)	An explanation linking: • largest amount of growth seen with the highest concentration of nitrates / the higher the concentration of nitrates the more growth /ORA (1) • nitrates are needed to make proteins (1)	 accept faster growth for more growth accept nitrates stimulate growth accept amino acids	**(2)** AO 3 2a AO 3 2b

Question number	Answer	Additional guidance	Mark
4(b)(ii)	An explanation that links the following: • by the roots/ root hair cells (1) AND • by diffusion (1) • from a high concentration to a low concentration / down the concentration gradient (1) OR • by active transport (1) • from a low concentration to a high concentration / against the concentration gradient / using energy (1)	 reject osmosis reject osmosis	**(3)** AO 2 1

Question number	Answer	Additional guidance	Mark
4(c)	An explanation linking three of the following: • to increase nitrate/ammonia levels in the soil (1) • because nitrogen fixing bacteria live in {colonies/root nodules} on the roots of pea and bean plants • (nitrogen-fixing bacteria) produce {nitrates/ nitrogen compounds / ammonia} (1) • from nitrogen {atmospheric/gas} (1)	 ignore live in the roots	**(3)** AO 1 1

Total for Question 4 = 12 marks

Question number	Answer	Additional guidance	Mark
5(a)(i)	An answer linking the following: • as light intensity increases so does the rate of photosynthesis (1) • (it levels off) when light intensity ceases to be a limiting factor (1)	 accept idea of another factor limiting the rate of photosynthesis accept named factor	**(2)** AO 3 1a AO 3 1b

Question number	Answer		Mark
5(a)(ii)	An explanation linking **two** of the following: • as temperature increases so does the rate of photosynthesis {as enzymes can catalyse more reactions / more collisions occur} (1) • maximum rate of photosynthesis at the optimum temperature for **enzymes** (1) • {above the optimum/at high temperatures} **enzymes** become denatured (and photosynthesis decreases) (1)	 accept more enzyme-substrate complexes form accept active site changes shape for denatured	**(2)** AO 3 2a AO 3 2b

Question number	Answer	Mark
5(b)	D inversely proportional to the distance from a light source **1. The only correct answer is D** ***A*** *is not correct because light intensity is not directly proportional to photosynthesis* ***B*** *is not correct because light intensity is not just inversely proportional to photosynthesis it is an inverse square.* ***C*** *is not correct because temperature is not directly proportional to photosynthesis*	**(1)** AO 1 1

Question number	Indicative content	Mark
***5(c)**	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO1 (marks)** Transpiration • the movement of water • from the root through the plant • through the lignified cells/dead cells • of the xylem • driven by evaporation of water from the leaves • through the stomata • flow is only in one direction • by capillary action • according to the cohesion-tension theory Translocation • the movement of sugars from the leaves • through the plant • as sucrose • through the living sieve cells • of the phloem • flow is bidirectional • to sinks in the plant where the sucrose is needed	**(6)** AO 1 1

Mark	Descriptor
0	No rewardable material.
1–2	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. • Presents an explanation with some structure and coherence.
3–4	• Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. • Presents an explanation that has a structure which is mostly clear, coherent and logical.
5–6	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. • Presents an explanation that has a well-developed structure which is clear, coherent and logical.

Total for Question 5 = 11 marks

Question number	Answer	Mark
6(a)(i)	An explanation linking **two** of the following: • women over the age of 50 have low levels of oestrogen (1) • (high levels of) oestrogen are needed for **LH** to be released / levels of oestrogen are too low for **LH** to be released (1) • (a surge of) LH is needed for ovulation to occur (1)	**(2)** AO 3 1a AO 3 1b

Question number	Answer	Additional guidance	Mark
6(a)(ii)	An explanation linking: • low levels of oestrogen (1) • (low levels of oestrogen) stops the lining of the uterus building up / so no lining to be lost (1)	 reject progesterone	**(2)** AO 3 2a AO 3 2b

Question number	Answer	Additional guidance	Mark
6(a)(iii)	An explanation linking the following: • causes the release of FSH (1) • stimulating eggs to develop (in the follicles/ovary) (1) OR • causes the release of LH (1) • stimulating ovulation (1)	 accept stimulates follicles to mature	**(2)** AO 2 1

Question number	Answer	Mark
6(a)(iv)	A corpus luteum **1. The only correct answer is A** ***B*** *is not correct because The pituitary gland releases the hormones LH and FSH not progesterone* ***C*** *is not correct because the thyroid gland releases TSH and thyroxine not progesterone* ***D*** *is not correct because the uterus does not release any hormones it is the site of the action of progesterone*	**(1)** AO 1 1

Question number	Answer	Additional guidance	Mark
6(b)	An explanation linking four of the following: • adrenalin acts to increase heart rate / blood pressure (1) • so there is increased blood flow (1) • causes the release of glucose from glycogen (1) • so increased {oxygen/glucose} (1) • increased the rate of respiration (1) • to **release energy** (for the working muscles/body) (1)	 accept more glucose released from liver/muscles accept ATP for energy	**(4)** AO 2 1

Total for Question 6 = 11 marks

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