Pearson Edexcel

Mark Scheme (Results)

Summer 2019

Pearson Edexcel GCSE

In Combined Science (1SC0) Paper 2BF

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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

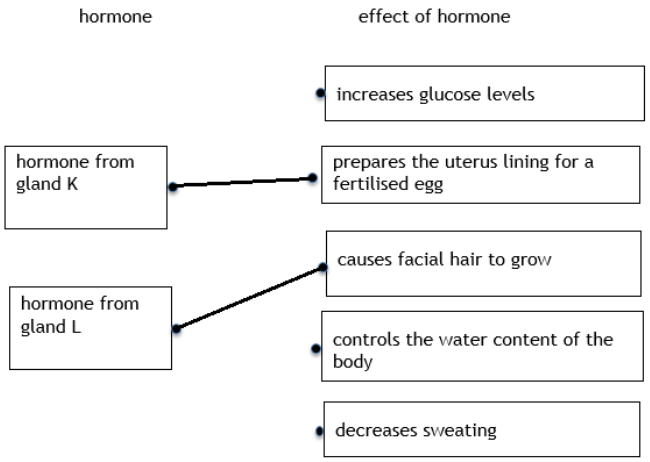
Question Number	Answer	Mark
1(a)(i)	Process G = Precipitation / type of precipitation eg rain (1) Process H = Evaporation / vaporisation (1)	**(2)** AO1.1

Question number	Answer	Mark
1(a)(ii)	**A** the water vapour cools down **The only correct answer is A** **B** *is not correct because the water vapour does not heat up to form clouds*. **C** *is not correct because the temperature of the water vapour does not stay the same to form clouds* **D** *is not correct because the trees do not absorb more water to form clouds*	**(1)** AO1.1

Question number	Answer	Additional guidance	Mark
1(b)	filtering (1) pathogens (1) accept phonetic spellings	answers must be in the correct order	**(2)** AO2.1

Question number	Answer	Additional guidance	Mark
1(c)	A description including **two** of the following: • desalination/ remove salt from the water (1) • evaporate the water (1) • condense water (vapour and collect it) (1)	accept alternative methods. accept heat or boil water. accept distillation for both MP2 and 3 (2)	**(2)** AO2.2

(Total for Question 1 = 7 marks)

Question number	Answer	Mark
2(a)	 Do not award mark if two lines are drawn from hormone box K Do not award mark if two lines are drawn from hormone box L	(2) *CS 7.1 AO2.1*

Question number	Answer	Mark
2(b)	**C** dissolved in blood plasma (1) **The only correct answer is C** **A** *is not correct because adrenalin is not transported by transpiration.* **B** *is not correct because the adrenalin is not transported by osmosis* **D** *is not correct because the adrenalin is not transported by red blood cells*	(1) AO1.1

Question number	Answer	Mark
2(c)	**D** homeostasis (1) **The only correct answer is D** **A** *is not correct because respiration is not the name given to the process of maintaining the internal body conditions*. **B** *is not correct because diffusion is not the name given to the process of maintaining the internal body conditions.* **C** *is not correct because digestion is not the name given to the process of maintaining the internal body conditions.*	(1) AO1.1

Question number	Answer	Mark
2(d)(i)	A description including two from: • fluctuates / stays roughly the same (1) • and then increases (1) • correct reference to data from the graph (1)	(2) AO3 1a 1b

Question number	Answer	Additional guidance	Mark
2(d)(ii)	An explanation including two from the following: • (more) insulin (is released) (1) • which makes the {cells / tissues / liver / muscles} absorb glucose (1) • to be {stored as /changed into} glycogen (1) • (glucose is) used to supply energy / in respiration / during exercise (1)	Reject create / make energy	**(2)** AO1 1 2.1

(Total for Question 2 = 8 marks)

Question number	Answer	Additional guidance	Mark
3(a)(i)	line A = 8(mm) line B = 4(mm) The below measurements are an accepted answer for modified papers. The letter pre-fixing the log number denotes the size. A4 18pt X56407 A 8mm B 4mm A4 24pt Y56407 A 8mm B 4mm A3 24pt Q56407 A 12mm B 6mm A3 36pt V56407 A 12mm B 6mm	accept ±0.5mm for both measurements.	**(1)** A02.2
3(a)(ii)	2:1 (1)	accept 8:4 / 4:2 ecf: accept a ratio of candidate's measurements of line A to line B from 3ai	**(1)** A02.1

Question number	Answer	Mark
3(b)(i)	• to stop backflow of blood / to ensure blood flows in {one direction /right direction/towards the heart} / because the blood pressure in them is (too) low .	(1) AO1.1
3(b)(ii)	(the) aorta accept phonetic spellings. Do not award if spelling is closer to artery than aorta.	(1) AO1.1

Question number	Answer	Additional Guidance	Mark
3(c)(i)	A description including: • The more exercise you do the more likely you are able to run at 3 metres per second for 20 minutes (1) • A comparison of the data of 2 groups (1)	Ignore just quoting data from the table	(2) AO31a 1b

Question number	Answer	Additional Guidance	Mark
3(c)(ii)	an explanation linking three from: • They had not warmed up / stretched (muscles before exercise) (1) • not enough blood / oxygen (gets to muscles / legs / around body) (1) • **anaerobic** respiration occurs (1) • lactic acid (produced / builds up) (1)		(3) AO2.1

(Total for Question 3 = 9 marks)

Question number	Answer	Mark
4(a)	• a diagram of the cell that reflects its shape and some of the internal structures. (1) • with any **three** cell structures labelled from: nucleus / chloroplast / vacuole / cytoplasm / cell wall / cell membrane (3)	(4) AO1.2

Question number	Answer	Mark
4(b)	**A** respiration **The only correct answer is A** **B** *is not correct because the* ***to*** *make proteins Is not the function of mitochondria in a plant cell.* **C** *is not correct because the photosynthesis Is not the function of mitochondria in a plant cell* D *is not correct because the store water Is not the function of mitochondria in a plant cell.*	**(1)** **AO1.1**

Question number	Answer	Additional guidance	Mark
4(c)(i)	• Used as a control / to compare with the results of the other tubes		(1) AO1.2

Question number	Answer	Mark
4(c)(ii)	Any two variables from: • temperature (1) • age / variety of potato (1) • {size / volume / length / width / shape / mass / surface area} of chip (before investigation) (1) • volume of solution (1) • time left in solutions (1)	(2) AO1.2

Question number	Answer	Mark
4(c)(iii)	An explanation including: • There is a higher concentration of sodium chloride outside (the cell) than inside / higher concentration of water molecules inside (the cell) than outside (1) • water moves out of {cells / chips} / into (sodium chloride) solution (1) • by <u>osmosis</u> (1)	(3) AO1.2

(Total for Question 4 = 11 marks)

Question number	Answer	Mark
5(a)(i)	2108 (g)	**(1)** AO2.1

Question number	Answer	Additional Guidance	Mark
5(a)(ii)	An explanation linking • population of earthworms will decrease (1) • because more earthworms will be eaten by hedgehogs (1)	accept earthworms will die out accept hedgehogs have only one food source accept population of earthworms will increase as more {food/cabbages} available (2 marks)	**(2)** AO2 1

Question number	Answer	Additional Guidance	Mark
5(a)(iii)	A description including • use of quadrat / belt transect (1) • count the number of slugs in the sampled area (1) • multiplication factor to make the estimate (1)	accept description of quadrat 1m x 1m /1m^2 accept calculate the mean numbers of slugs from all samples	**(3)** AO3 3a

Question number	Answer		Mark
5(b)	An explanation linking three from • {squirrels / earthworms / cabbages} release carbon dioxide (1) • from respiration (1) • cabbages take in carbon dioxide (1) • (cabbages) for photosynthesis (1) • when organisms die decomposers release carbon dioxide (1) • {squirrels/earthworms} eat {cabbages/plants} which contain **carbon** (1) • egestion releases **carbon (**into the soil) (1)	accept CO_2 reject CO^2 accept **decomposers** respire accept squirrels eat earthworms which contain carbon accept named methods of egestion	**(3)** AO2 1

Question number	Answer	Additional Guidance	Mark
5(c)	Any three from: • (add) artificial fertilisers (1) • (add) manure / slurry / (use) green manuring (1) • use crop rotation (1) • nitrogen fixing bacteria (1) • nitrifying bacteria (1)	accept add fertiliser / add nitrates / named nitrate compound. accept description of green manuring / add faeces /compost /decomposing matter. accept nitrification accept lightning (1)	**(3)** A01.1

(Total for Question 5 = 12 marks)

Question number	Answer	Additional Guidance	Mark
6(a)(i)	Any two from: • same concentration of indicator (1) • same mass of organisms (1) • same volume of indicator (1) • same temperature (1) • same volume / size of test tube (1) • repeat the experiment (1) • use a control (1)	accept weight for mass accept mass/weight ignore references to time as this is in the stem of the question	**(2)** AO3.3b

Question number	Answer	Additional guidance	Mark
6(a)(ii)	A description including: • same test tube, gauze and bung with (hydrogencarbonate) indicator (1) • without any live organisms / with a mass of inert object e.g.stones /dead peas/glass beads(1)	accept set up the same {apparatus/equipment}	**(2)** Ao2 2

Question number	Answer:	Additional guidance	Mark
6(b)(i)	An explanation linking • germinating peas **produce** carbon dioxide (1) • because germinating peas were respiring (aerobically) (1)	accept dried peas did not **produce** carbon dioxide accept because dried peas **do not** respire	**(2)** AO3 1ab

Question number	Answer	Mark
6(b)(ii)	**B** when glucose is broken down in the presence of oxygen **The only correct answer is B** **A** *is not correct because the carbon dioxide was not produced by photosynthesis in this investigation.* **C** *is not correct because the carbon dioxide was not produced when glucose is broken down in the absence of oxygen in this investigation.* **D** *is not correct because the carbon dioxide was not produced by the reaction between oxygen and water in this investigation.*	**(1)** AO3 1ab

Question number	Indicative content	Mark
6(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)** **Red blood cells** **<u>structure</u>** — **<u>function</u>** • to carry oxygen • contains haemoglobin — • oxygen is joined to haemoglobin. • biconcave disc shaped — • to increase surface area / to absorb / to release oxygen quicker • small / flexible / smooth — • so can fit through capillaries • no nucleus — • so can contain more haemoglobin **White blood cells** **<u>structure</u>** — **<u>function</u>** • is part of the immune system / fights disease has receptors on membrane — • can recognise pathogens / antigens • are large cells /can change shape / have flexible membranes — • can engulf pathogens • has a nucleus / ribosomes — • makes antibodies / antitoxins / remember antigens from a previous infection	**(6)** **A01.1**

Level	Mark	
	0	No rewardable material.
Level 1	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.
Level 2	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.
Level 3	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 6 = 13 marks)

Level	Mark	Additional Guidance	General additional guidance **The level is determined by the functions in the response** **The mark within the band is determined by the linkage of the structure to the function.**
	0	No rewardable material.	
Level 1	1–2	• A simple reference to one function **or** structure of red **or** white blood cells. • Linked to the structure that relates to that function.	<u>Possible candidate responses</u> • Red blood cells carry oxygen • Red blood cells contain haemoglobin that join to oxygen.
Level 2	3–4	• A reference to at least two functions related to red **or** white blood cells. • Linked to the structures that relate to the stated functions.	<u>Possible candidate responses</u> • Red blood cells carry oxygen and white blood cells kill bacteria. • Red blood cells are small so they fit through capillaries and have haemoglobin to carry oxygen • Red blood cells are biconcave discs so they can absorb more oxygen and white blood cells have a flexible membrane so they can surround a bacterium.
Level 3	5–6	• A detailed reference to at least three functions related to red **and** white blood cells • Linked to a structure of red blood cells **and** a structure of white blood cells that are related to the stated functions.	<u>Possible candidate responses</u> • Red blood cells do not have a nucleus so that they can hold more haemoglobin which carries the oxygen. White blood cells fight disease • White blood cells produce antibodies and have sticky bits on their membrane that can recognise antigens. Red blood cells have a biconcave disc shape so that they have a large surface area to absorb oxygen.

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