Pearson
Edexcel

Mark Scheme
(Results)

November 2020

Pearson Edexcel GCSE
In Combined Science (1SC0) Paper 2BF

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General Marking Guidance

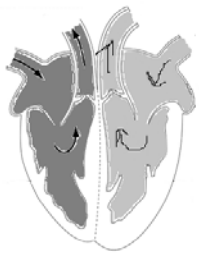
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should 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.

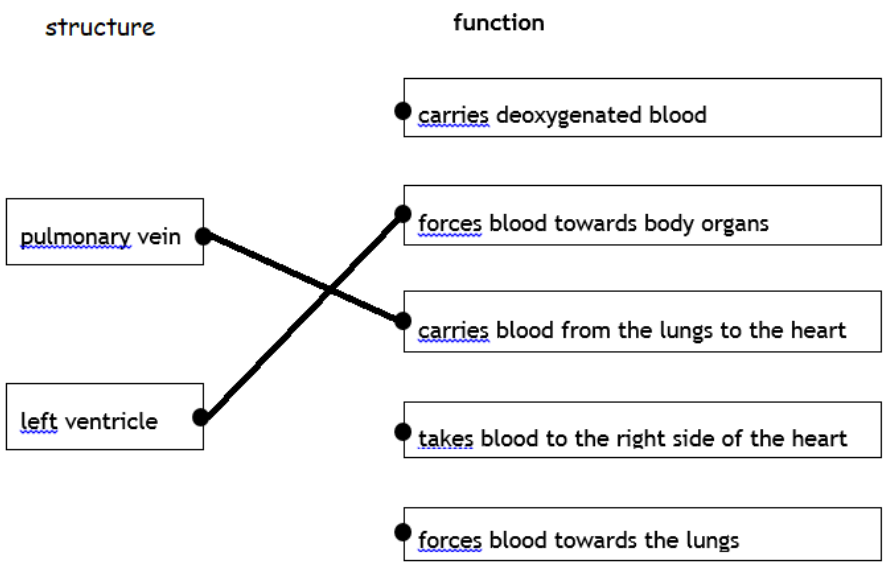
Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of 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	Additional guidance	Mark
1(a)(i)	All three arrows in correct direction (1) 	accept any number of arrows showing the correct route	(1)

Question number	Answer	Mark
1(a)(ii)	B valve T closes The only correct answer is **B** valve T closes A is incorrect because valve T does not open. C is incorrect because blood is not forced into the left atrium. D is incorrect because blood is not forced into the pulmonary vein.	(1)

Question number	Answer	Mark
1(a)(iii)		(2)

	Reject if more than one line is drawn from each structure.	

Question number	Answer	Mark
1(b)(i)	An explanation linking the following: • the valve closes (1) • (therefore) it prevents backflow (1)	**(2)**

Question number	Answer	Additional guidance	Mark
1(b)(ii)	To kill bacteria / pathogens / microorganisms /	accept to sterilise equipment ignore disinfect / clean equipment	**(1)**

Total for question 1 = 7 marks

Question number	Answer	Mark
2(a)(i)	food reject if more than one word is used from the box	(1)

Question number	Answer	Mark
2a(ii)	parasites reject if more than one word is used from the box	(1)

Question number	Answer	Mark
2(b)	C platelets The only correct answer is **C** platelets A is incorrect because red blood cells do not start the clotting process. B is incorrect because water does not start the clotting process. D is incorrect because white blood cells do not start the clotting process.	(1)

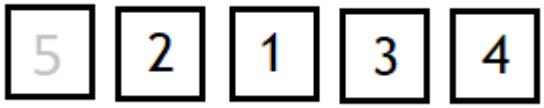
Question number	Answer	Additional guidance	Mark
2(c)(i)	mutualism / mutualist / mutualistic	accept mutual accept symbiotic / symbiosis /symbionts	(1)

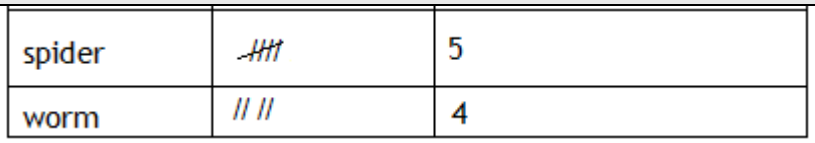
Question number	Answer	Additional guidance	Mark
2(c)(ii)	• grass (in first box) (1) • zebra, tick, oxpecker (in correct order in boxes 2,3 and 4) (1)	Award one mark if grass, zebra, tick and oxpecker are in the correct order but written from right to left.	**(2)**

Question number	Answer	Additional guidance	Mark
2(d)(i)	A description including: • there are more oxpeckers on the (white) rhinos (than hippos) (1) • manipulated data (1)	Manipulated data could include: 7 - 2 = difference of 5 7 ÷ 2 = 3.5 times more oxpeckers (2 marks)	**(2)**

Question number	Answer	Additional guidance	Mark
2(d)(ii)	There are more ticks / food (on the giraffes than the zebras)	accept other reasons such as (giraffes are) larger / thinner skinned / more tolerant of oxpeckers	**(1)**

Total for question 2 = 9 marks

Question number	Answer	Additional guidance	Mark
3(a)	 • Correct sequence (2)	award one mark if 2 is in the second box or 4 is in the last box.	(2)

Question number	Answer	Mark
3(b)(i)	 • Spider line correct (1) • Worm line correct (1)	(2)

spider	𝍸	5
worm	// //	4

Question number	Answer	Additional guidance	Mark
3(b)(ii)	Substitution 6 out of 30 / 6 in 30 / 6/30 (1) Simplest form 1 in 5 / 1/5 / 0.2 / 20%	accept there are 6 ants and there are 30 invertebrates. award full marks for correct answer with no working.	(2)

Question number	Answer	Mark
3(b)(iii)	One type of food may only attract some invertebrates / some foods may attract many different types of invertebrates.	(1)

Question number	Answer	Mark
3(c)	A description including: • Calculate a mean / average (1) • Multiply mean by 40 / the area (1) OR • Add together the number of snails in the 4 areas (1) • Multiply by 10 (1)	**(2)**

Total for question 3 = 9 marks

Question number	Answer	Mark
4(a)(i)	D pancreas insulin The only correct answer is **D** pancreas insulin A is incorrect because the ovary does not produce a hormone that controls blood glucose concentration. B is incorrect because the ovary does not produce a hormone that controls blood glucose concentration. C is incorrect because oestrogen does not control blood glucose concentration.	**(1)**

Question number	Answer	Mark
4(a)(ii)	Liver / muscles / named muscle	**(1)**

Question number	Answer	Additional guidance	Mark
4(b)(i)	Substitution $110 \div 2.0^2$ (1) Evaluation = 27.5	 accept 28 Award full marks for correct answer with no working.	**(2)**

Question number	Answer	Mark
4(b)(ii)	A description that includes **two** from: • lose weight (1) • control diet / eat less sugary food (1) • exercise **more** (1)	**(2)**

Question number	Answer	Mark
4(c)(i)	A aerobic respiration and anaerobic respiration. The only correct answer is **A** aerobic respiration and anaerobic respiration B is incorrect because anaerobic respiration uses glucose. C is incorrect because aerobic respiration uses glucose. D is incorrect because aerobic respiration and anaerobic respiration use glucose.	**(1)**

Question number	Answer	Mark
4(c)(ii)	An explanation linking **three** of: • as activity / speed increases, the respiration rate increases (1) • because respiration supplies energy (to muscles / cells) (1) • when sleeping you are not moving / using muscles very much (1) • the faster you run / the more you use muscles (1) • so more energy is required. (1)	**(3)**

Total for question 4 = 10 marks

Question number	Answer	Additional guidance	Mark
5(a)	An explanation including the following: • lower surface (of leaf) is not in contact with air / is in water (1) • so gas exchange cannot occur (1)	 accept water would enter the stomata accept oxygen /carbon dioxide /water (vapour) accept reduced/no transpiration	**(2)**

Question number	Answer	Mark
5(b) (i)	D chloroplast The only correct answer is **D** chloroplast A is incorrect because the nucleus does not photosynthesise B is incorrect because the vacuole does not photosynthesise C is incorrect because the mitochondrion does not photosynthesise	**(1)**

Question number	Answer	Mark
5(b)(ii)	C sucrose The only correct answer is **C** sucrose A is incorrect because glycerol is not a sugar B is incorrect because although ribose is a sugar this is found in DNA D is incorrect because starch is not a sugar	**(1)**

Question number	Answer	Additional guidance	Mark
5(b)(iii)	A description including two from: • in the phloem (1) • dissolved (in water) (1) • by translocation (1) • using active transport (1)	 reject xylem accept by diffusion	(2)

Question number	Answer	Mark
5(c)(i)	An explanation linking three from the following: • because {conditions / named conditions} are suitable for {growth / photosynthesis} /conditions similar to native conditions /it is adapted to the conditions (1) • it outcompeted the natural plants (1) • therefore, it {grows / reproduces} (1) • as no natural herbivores {eat it / restrict it} (1)	(3)

Question number	Answer	Mark
5(c) (ii)	An explanation linking three of the following: • biodiversity is reduced / fewer {plants / plant species} / reduced number of {animals / animal species} (1) • (fewer plants because) less light reaches the water (1) • so less photosynthesis in plants below lilies (1) • lower oxygen concentration in water / oxygen is used up by decomposers (1) • (fewer animals because) less food for animals (1)	(3)

Total for question 5 = 12 marks

Question number	Answer	Mark
6(a)(i)	6 / six	(1)

Question number	Answer	Mark
6(a)(ii)	D cell wall, chloroplast, large vacuole. The only correct answer is **D** cell wall, chloroplast, large vacuole A is incorrect because both the cell membrane and nucleus are also found in animal cells B is incorrect because the cell membrane and cytoplasm are also found in animal cells C is incorrect because the nucleus is also found in animal cells	(1)

Question number	Answer	Additional guidance	Mark
6(b)(i)	Substitution (50 – 30 =) 20 (1) (20 ÷ 50 x 100 =) -40(%)	 Accept 40% Award full marks for answer without working	(2)

Question number	Answer	Additional guidance	Mark
6(b) (ii)	Any two from: • variety of potato (1) • mass of potato (1) • age of potato (1) • temperature (1) • storage conditions/humidity (1)	 accept type / species accept weight/size accept potato cells taken from the same part of each potato	(2)

Question number	Indicative content	Additional guidance	Mark
6(b)(iii)	for energy / respiration	ignore make / produce energy accept to produce ATP	(1)

Question number	Indicative content	Mark
6(c)*	**Plan for the investigation** • put a light (source) at a distance away from the pondweed • measure the volume of oxygen / count the number of bubbles • in a set time • repeat with the light at different distances **Variables and how to control them** **ambient light** • use darkened room / close curtains / turn lights out • use a light meter to measure light intensity • use the same light source at each distance **temperature (of water)** • use a heat shield • use a thermometer and add cold water as necessary **carbon dioxide concentration (in water)** • add sodium hydrogen carbonate to the water **bubbles contain different volumes of gas** • measure volume of oxygen in the test tube • replace the test tube with a measuring cylinder **acclimatisation period** • wait for the rate to settle down before you count the bubbles **amount of pondweed** • use the same pondweed each time.	(6)

Level	Mark	Descriptor
	0	• No awardable content
Level 1	1-2	• The plan attempts to link and apply knowledge and understanding of scientific enquiry, techniques and procedures, flawed or simplistic connections made between elements in the context of the question. (AO2) • Analyses the scientific information but understanding and connections are flawed. An incomplete plan that provides limited synthesis of understanding. (AO3)
Level 2	3-4	• The plan is mostly supported through linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, some logical connections made between elements in the context of the question. (AO2) • Analyses the scientific information and provides some logical connections between scientific enquiry, techniques and procedures. A partially completed plan that synthesises mostly relevant understanding, but not entirely coherently. (AO3)
Level 3	5-6	• The plan is supported throughout by linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, logical connections made between elements in the context of the question. (AO2) • Analyses the scientific information and provide logical connections between scientific concepts throughout. A well-developed plan that synthesises relevant understanding coherently. (AO3)

Level	Mark	Additional Guidance	General additional guidance The level is determined by the detail of the plan The mark within the level is determined by the number of variables and how to control them
	0	No rewardable material	
Level 1	1–2	• A simple answer stating at least one correct aspect of a plan • A reference to one variable that can be controlled	<u>Possible candidate responses</u> • Move the light to different distances. • You need to control the temperature of the water.
Level 2	3–4	• An answer that describes a workable plan • A detailed answer of how to control one variable OR a reference to more than one variable that need to be controlled	<u>Possible candidate responses</u> • Count the number of bubbles. Move the light further away and count again • Control the temperature of the water by using a water bath • Control the temperature of the water and close the blinds
Level 3	5-6	• A detailed workable plan • A detailed answer of how to control one variable AND at least one other reference to a different variable to be controlled	<u>Possible candidate responses</u> • Place the light at 10cm from the pondweed. Count the bubbles in one minute. Move the light to other distances and count the number of bubbles in one minute again. • Put a sheet of glass between the light and pondweed to stop it heating up. The amount of pondweed should be the same.

Total for question 6 = 13 marks