



Mark Scheme (Results)

Summer 2024

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

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2024

Question Paper Log Number P75515A

Publications Code 1SC0_2BH_2406_MS

All the material in this publication is copyright

© Pearson Education Ltd 2024

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.

Question Number	Answer	Mark
1(a)(i)	plasma (accept phonetic spellings)	(1) AO2 1

Question Number	Answer	Mark
1(a)(ii)	The only correct answer is D oxygen A is incorrect because carbon dioxide is not needed for respiration B is incorrect because urea is not carried by red blood cells or needed for respiration C is not correct because amino acids are not needed for respiration	(1) AO1 1

Question Number	Answer	Additional guidance	Mark
1(a)(iii)	<ul style="list-style-type: none"> phagocytes (1) lymphocytes / B cells / memory cells (1) 	<p>answers can be in either order</p> <p>accept T cells</p> <p>accept other correctly named white blood cells (1)</p>	(2) AO1 1

Question Number	Answer	Additional guidance	Mark
1(b)(i)	$470 \div 100$ or 4.7 (1) $(4.7 \times 44) = 206.8$ (1) 207 OR $44 \div 100$ or 0.44 (1) $(0.44 \times 470) = 206.8$ (1) 207 OR 44×470 or 20680 (1) $(20680 \div 100) = 206.8$ (1) 207	accept correct answer on answer line for 3 marks award two marks for $206.8 / 206$ ecf for a calculated number in the working to the nearest whole number accept alternative methods of calculating percentages award two marks for 263 award one mark for 263.2	(3) A02 1

Question Number	Answer	Additional guidance	Mark
1(b)(ii)	<p>Any two from:</p> <ul style="list-style-type: none"> • wear gloves / wash hands (1) • sterilise skin (of donor) (1) • use sterile needle (1) • cover the wound after taking the blood (1) 	<p>accept wear a mask accept use hand gel accept the doctor covers any open wounds / cuts</p> <p>accept clean the skin</p> <p>accept sterilise equipment</p>	(2) A02 1

(Total for question 1 = 9 marks)

Question Number	Answer	Mark
2(a)(i)	vacuole / large vacuole / permanent vacuole (accept phonetic spellings)	(1) A02 1

Question Number	Answer	Mark
2(a)(ii)	Any one from: <ul style="list-style-type: none"> • it has a large surface area / it is long / large surface area : volume (1) • thin (cell) walls (1) • many mitochondria (1) 	(1) A02 1

Question Number	Answer	Additional Guidance	Mark
2(a)(iii)	An explanation including three from: <ul style="list-style-type: none"> • (root hair cells grow) underground (1) • where there is no sunlight / light (1) • so they can't photosynthesise (1) 	accept roots grow underground / in the soil accept roots can't photosynthesise / chloroplasts are needed for photosynthesis	(3) A02 1

Question Number	Answer	additional guidance	Mark
2(b)(i)	<p>A description including two of the following:</p> <ul style="list-style-type: none"> in tap water chloroplasts are near the {cell wall / cell membrane / edge of the cell} (1) in salt water chloroplasts are in the middle of the cells / chloroplasts clump together (1) 	<p>accept reverse argument about cells not in salt solution</p> <p>accept cells appear larger / cells are more magnified (in salt water) (1)</p>	(2) A03 2ab

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	<p>An explanation including three from:</p> <ul style="list-style-type: none"> water has moved (1) by osmosis (1) from a high water concentration to low water concentration (1) through a partially-permeable membrane (1) 	<p>accept correct references to the concentration gradient / water potential / low to high solute concentrations</p>	(3) A02 1

(Total for question 2 = 10 marks)

Question number	Answer	Additional guidance	Mark
3(a)(i)	<p>A plan including three from:</p> <ul style="list-style-type: none"> • use a quadrat (1) • use a random number generator (to decide the areas to sample) / use random co-ordinates (1) • (use a key) to identify the plants (1) • count the number of plant species (1) 	<p>ignore belt transect</p> <p>accept square / grid</p> <p>ignore sample the number of plant species</p>	<p>(3) AO3 3a</p>

Question number	Answer	Additional guidance	Mark
3(a)(ii)	<p>Any three from:</p> <ul style="list-style-type: none"> • measure the temperature with a thermometer (1) • measure the light levels using a {lux / light} meter (1) • measure the levels of water in the soil using a water {meter / sensor / wet - dry mass of soil sample} (1) • rainfall using a {measuring cylinder / beaker} (1) • humidity using a humidity {meter / sensor} (1) • depth of the soil using a ruler (1) 	<p>accept heat for temperature</p> <p>accept photometer / phone app / light sensor</p> <p>accept data logger</p> <p>accept datalogger accept hygrometer</p> <p>accept</p>	<p>(3) AO1 2</p>

	<ul style="list-style-type: none"> wind {direction / strength} using {wind sock / wind meter} (1) 	anemometer / weather vane / air flow meter	
--	--	--	--

Question number	Answer	Additional guidance	Mark
3(a)(iii)	<p>A description including two from:</p> <ul style="list-style-type: none"> the tree is the host (1) the mistletoe gains {nutrients / water} from the tree (1) the tree is damaged by the mistletoe (1) 	accept any indication of harm including killing the tree	(2) A01 1

Question number	Answer	Additional guidance	Mark
3(b)	<p>An explanation including:</p> <ul style="list-style-type: none"> (fertilisers are used) to increase {growth / repair} of plants (1) (because nitrates are needed) to make proteins (1) 	accept DNA / amino acids for proteins	(2) A01 1

(Total for question 3 = 10 marks)

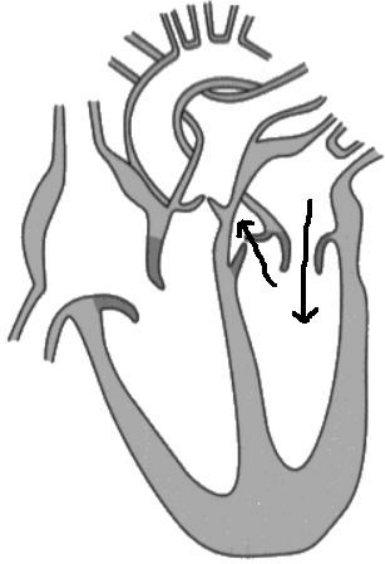
Question number	Answer	Additional guidance	Mark
4(a)(i)	<p>A description including:</p> <ul style="list-style-type: none"> repeat the experiment / use a measuring cylinder with yeast and washing up liquid (1) add water only (1) 	accept 0% glucose solution	(2) AO2 2

Question number	Answer	Additional guidance	Mark
4(a)(ii)	increase the temperature (so the reaction happens faster) / add more yeast	accept heat it up	(1) AO3 3b

Question number	Answer	Additional guidance	Mark
4(b)(i)	<p>An explanation including:</p> <ul style="list-style-type: none"> the result of 3 / the result at 15% (1) because the result does not follow the pattern / because the height of foam is less than expected / it is less than the 10% concentration (1) 	<p>accept height of the foam {did not increase / decreased} / all the other values show an increase</p> <p>accept the result of 5 / result at 10% (1) because it was higher than expected (1)</p>	(2) AO3 1ab

Question number	Answer	Additional guidance	Mark
4(b)(ii)	<p>An explanation linking three of the following:</p> <ul style="list-style-type: none"> • at 25% concentration there is more {substrate / glucose} (1) • to bind with the {enzymes / active site} / enzyme-substrate complexes formed (1) • more respiration takes place (1) • so carbon dioxide is produced (1) • because the glucose is the limiting factor (1) 	<p>accept glucose concentration is high</p> <p>accept respiration occurs for longer</p>	(3) AO2 1

(Total for question 4 = 8 marks)

Question number	Answer	Additional guidance	Mark
5(a)(i)	 <p>arrow indicating blood flow through the atrioventricular valve (1) arrow indicating blood flow through the semi-lunar valve (1)</p>	no marks awarded if any arrows on right side of heart	(2) A02 1

Question number	Answer	Additional guidance	Mark
5(a)(ii)	vena cava / superior vena cava		(1) A01 1

Question number	Answer	Additional guidance	Mark
5(b)(i)	<p>(at rest 68×72) = 4896 (exercise 112×124) = 13888 (1)</p> <p>13888 - 4896 = 8992 (1)</p> <p>8990</p> <p>units (1) cm³ per min cm³/min cm³.min⁻¹</p>	<p>accept either value for 1 mark</p> <p>accept 8992 for 2 marks</p> <p>accept 8990 for 3 marks with no working</p> <p>accept ml/min ml.min⁻¹ accept minute</p>	(4) A03 2ab

Question number	Answer	Additional guidance	Mark
5(b)(ii)	<p>An explanation linking four of the following:</p> <ul style="list-style-type: none"> to deliver more oxygen (to the muscles) (1) to deliver more glucose (to the muscles) (1) to remove more carbon dioxide (1) to prevent build-up of lactic acid (1) to increase (the rate of aerobic) respiration (1) and therefore release more energy (1) 	<p>accept more oxygenated blood</p> <p>accept remove lactic acid</p> <p>ignore produce energy</p>	(4) A01 1

(Total for question 5 = 11 marks)

Question number	Answer	Mark
6(a)(i)	<p>The only correct answer is B oestrogen and progesterone</p> <p>A is incorrect FSH causes the egg to develop in the follicle</p> <p>C is not correct because LH causes ovulation</p> <p>D is not correct because FSH causes the egg to develop in the follicle and LH causes ovulation</p>	(1) A01 1

Question number	Answer	Additional guidance	Mark
6(a)(ii)	<p>An explanation linking:</p> <ul style="list-style-type: none"> oestrogen inhibits FSH (1) so the {egg / follicle} cannot mature (1) progesterone inhibits {LH / FSH} (1) 	<p>reject oestrogen inhibits LH</p> <p>accept FSH causes the {egg / follicle} to mature</p> <p>ignore no eggs are released / ovulation</p>	(3) A01 1

Question number	Answer	Additional guidance	Mark
6(a)(iii)	<p>An explanation including:</p> <ul style="list-style-type: none"> stops the sperm and the egg from meeting (1) so there will be no fertilisation (1) 	<p>accept gametes for sperm and ovum</p> <p>accept prevents sperm entering the vagina / cervix / uterus</p>	(2) A02 1

Question number	Indicative content	Mark
6*(b)	<p style="text-align: center;">AO1 6 marks</p> <p>Clomifene therapy</p> <ul style="list-style-type: none"> • Clomifene is a fertility drug • that causes the pituitary gland • to release more FSH and LH • so more eggs are matured in the follicle • more chance of the egg being released <p>IVF (<i>in vitro</i> fertilisation)</p> <ul style="list-style-type: none"> • eggs are removed from the mother's ovary • sperm are taken from the father • the sperm and the eggs are mixed / the sperm is injected into the egg • in a <i>Petri</i> dish • the fertilised egg is allowed to divide • the {fertilised egg / ball of cells / zygote / embryo} is placed into the uterus 	(6)

Level	Mark	Descriptor
	0	<ul style="list-style-type: none"> • no rewardable material.
Level 1	1-2	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.
---------	-----	---

Additional Guidance

Level 1	1-2	<ul style="list-style-type: none"> • A brief explanation of either IVF OR Clomifene therapy OR other ART techniques • The response links the method to a hormone, named process or the idea of external fertilisation
Level 2	3-4	<ul style="list-style-type: none"> • A brief explanation of how IVF AND Clomifene therapy work OR a detailed explanation of one method • The response links one method to the type of ART either Clomifene OR IVF
Level 3	5-6	<ul style="list-style-type: none"> • A detailed explanation of BOTH IVF and Clomifene therapy • The response links both methods to the type of ART, Clomifene AND IVF

(Total for question 6 = 12 marks)