Mark Scheme (Results)

Summer 2024

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

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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.

Question number	Answer	Mark
1(a)(i)	B amino acids **The only correct answer is B** *A is incorrect because sugars are not produced when a protein is broken down.* *C is incorrect because fatty acids are not produced when a protein is broken down.* *D is incorrect because starches are not produced when a protein is broken down.*	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
1(a)(ii)	A description including three from: • (activity) increases (1) • from pH 0.2 / to pH 2 (1) • optimum (activity) at pH 2 (1) • (pepsin activity) decreases {from pH 2 / to pH 3.5} (1)	accept best / maximum / most active / optimal / peak for optimum accept pH 3.6	**(3)** **AO3 1a 1b**

Question number	Answer	Mark
1(a)(iii)	(pH) 8 / 8.0 / eight accept phonetic spellings of eight	**(1)** **AO3 1a**

Question number	Answer	Additional guidance	Mark
1(a)(iv)	An explanation including three from: • pH 5 is **too** {acidic / low} (1) • active site (of the enzyme) has changed (1) • (so the) substrate will not {fit into / bind with} (the active site) (1) • no enzyme-substrate complex is formed (1) • because the enzyme is **denatured** (1)	accept proteins for substrate accept enzyme and substrate are no longer complementary ignore references to collisions between the substrate and the active site the active site is denatured is two marks	**(3)** **AO2 1**

Question number	Answer	Additional guidance	Mark
1(a)(v)	(use a) water bath / incubator / idea of how the temperature can be set in a room	accept a description of a water bath ignore in the same room / use a thermometer	**(1)** **AO1 2**

(Total for question 1 = 9 marks)

Question number	Answer	Mark
2(a)(i)	C a protist **The only correct answer is C** *A is incorrect because malaria is not caused by a bacterium* *B is incorrect because malaria is not caused by a fungus* *D is incorrect because malaria is not caused by a virus*	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
2(a)(ii)	by vectors / mosquitoes	accept blood transfusions / through blood / **sharing contaminated** needles ignore insects / animals	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
2(b)	An explanation linking: • (the number of measles cases reported) has decreased (1)	accept herd immunity accept by vaccines /	**(2)** **AO2 1**

	• because {people have been immunised / more people are immune} (1)	vaccination	

Question number	Answer	Additional guidance	Mark
2(c)	Any **two** from: • white blood cells {kill / destroy} pathogens (1) • (WBC) produce {antibodies / antitoxins} (1) • memory lymphocytes (are produced) (1)	accept named pathogens accept phagocytosis accept WBC engulf pathogens reject antigens accept memory cells accept rise in body temperature / inflammation / more mucus produced / **more** WBC are produced / WBC move to site of infection (1)	**(2)** **AO1 1**

Question number	Answer	Additional guidance	Mark
2(d)	(beriberi) is not spread from person to person / is not caused by a {pathogen	accept organisms for people	**(1)** **AO2 1**

	/ named pathogen}	ignore it is a deficiency disease / not infectious / not contagious / it is caused by a lifestyle factor	

(Total for question 2 = 7 marks)

Question number	Answer	additional guidance	Mark
3(a)(i)	One from: • use a sterile {swab / equipment} • avoid the swab touching another surface • dispose of the swab in disinfectant • don't swab too {hard/far back}	accept sanitise / disinfect for sterile ignore clean / new accept idea of disposal of the {swab/gloves} after ignore general laboratory rules / slide preparation / cleaning the area	**(1)** **AO2 2**

Question number	Answer	Additional guidance	Mark
3(a)(ii)	An answering including: • start with the lowest objective lens (1) • use the focusing wheel / focus (1) • (increase magnification to) ×40 **objective lens** (1)	accept lowest {magnification / lens} / x4 lens accept use {adjustment / focus} knob / move the stage accept 400x objective lens if no eye piece magnification given	**(3)** **AO1 2**

	• with a 10x **eye piece lens** (1)	**If neither of the final two points are given:** accept both named lenses with alternative magnification**s** that total ×400 for 2 marks accept use a x40 and x10 lens for 1 mark accept named objective **and** eye piece lens without magnifications for 1 mark	

Question number	**Answer**	**additional guidance**	**Mark**
3(b)	An explanation linking: • mitochondria (1) • which release energy / are where respiration occurs (1) OR • ribosomes (1)	 ignore makes / produces energy ignore respirate / anaerobic respiration accept produce ATP accept a description of protein synthesis /	**(2)** **AO1 1**

	• which is where proteins are made / protein synthesis (1)	translation	

Question number	Answer	additional guidance	Mark
3(c)	An answer including three from: • crush the cells (1) • add detergent / add a protease / add salt (1) • heat the sample (1) • filter (the extract) (1) • add ethanol (to the filtrate) (1)	accept crush the fruit accept named detergents / soap accept named protease accept use a water bath accept alcohol	**(3)** **AO2 2**

Question number	Answer	additional guidance	Mark
3(d)	An answer including two from: • {map / find} the genes (1) • find the amino acid sequences / find the functions of proteins (1) • identify {alleles / mutations} (1) • genetic testing / prediction of disease risk (1) • personalised medicines / production of new medicines (1)	accept find the location of genes on chromosomes accept find the role of each gene accept better understanding of {diseases / inherited disorders} accept development of {new / better} treatments / gene therapy accept the idea of studying migration / ancestry (1)	**(2)** **AO1 1**

(Total for question 3 = 11 marks)

Question number	Answer	additional guidance	Mark
4(a)(i)	it is more sophisticated / it is more shaped / it is sharper / been carved	accept ideas around more complex	**(1)** **AO3 1a**

Question number	Answer	additional guidance	Mark
4(a)(ii)	An answer including two from: • location in the rock layer / how deep the tool is found (1) • older tools are deeper / ORA (1) • using other fossils found in the location (1)	accept stratigraphy accept radiometric dating of the rock layer (1) ignore carbon dating ignore measure the radiation in rocks	**(2)** **AO1 1**

Question number	Answer	additional guidance	Mark
4(b)	An answer including two from: • larger skull / indication of larger brain (1) • bipedalism / description of bipedalism (1)	list rule applies accept (changes to) skull shape / larger brain / changes to teeth accept (walking) upright / pelvic changes / straight**er**	**(2)** **AO1 1**

	• taller (1) • opposable thumbs /shorter {fingers / toes} / arched feet (1)	spine accept shorter arms / longer legs / changes in arm:leg ratio ignore limbs get {shorter / longer}	

Question number	Answer	additional guidance	Mark
4(c)(i)	Substitution 434 ÷ 62 000 (1) Evaluation 0.007 (1) Conversion 7 (μm) OR Conversion 434 x 1000 (1) Substitution 434 000 ÷ 62 000 (1) Evaluation 7 (μm)	Award full marks for correct answer without workings ecf for conversion (x 1000) from an incorrect evaluation award two marks for answer to the	**(3)** **AO1 2**

		incorrect order of magnitude.	

Question number	Answer	additional guidance	Mark
4(c)(ii)	An answer linking: • because it has a greater **magnification** (1) • because it has a greater **resolution** (1)	ignore see more detail accept idea that {electrons/electron beams} have a shorter wavelength (1)	**(2)** **AO2 1**

(Total for question 4 = 10 marks)

Question number	Answer	additional guidance	Mark
5(a)(i)	An answer including two from: • reduce bias (by the doctor) (1) • placebo **effect** (1) • know whether the side effects are due to **statins** (1) • allows effectiveness of statins to be {determined / compared} (1)	allow the drug / medicine / pills for statins accept a description of the placebo **effect** ignore identify side effects / test safety	**(2)** **AO2 1**

Question number	Answer	Mark
5(a)(ii)	D clinical **The only correct answer is D** ***A*** *is not correct because double-blind trials are not the discovery stage* ***B*** *is not correct because double-blind trials are not the development stage* ***C*** *is not correct because double-blind trials are not the preclinical stage*	**(1)** **AO1 1**

Question number	Answer	additional guidance	Mark
5(b)(i)	14.8 ÷ 100 **or** 0.148 (1) 9 199 ÷ 0.148 = 62 155 (1) Evaluation 62 160 **OR** 9 199 ÷ 14.8 **or** 621.55(1) 621.55 x 100 = 62 155 (1) Evaluation 62 160 **OR** 100 ÷ 14.8 **or** 6.757 (1) 6.757 x 9199 = 62155 (1) Evaluation 62160	Award full marks for the correct answer with no working accept any number of d.p. accept any number of d.p. accept any number of d.p. accept 62155 or 62150 or 62200 for 2 marks **maximum of one mark for an answer using a percentage other than 14.8 given to 4 s.f.**	**(3)** **AO3 1**

Question number	Answer	additional guidance	Mark
5(b)(ii)	An answer linking three from: • the data for the placebo and the statins are very similar (1) • in year one more people taking statins reported muscle pain (1) • (in year 1) difference was only 0.8% (1) • over time the muscle pain is reduced in those people taking statins (1) • in {year 2/year 3/year 4} more people taking the placebo reported muscle pain (1)	 accept quoted data from a year to illustrate the similarity accept calculated differences for years 2, 3 or 4.	**(3)** **AO3 1**

Question number	Answer	additional guidance	Mark
5(b)(iii)	Any two from: • age (1) • sex (1) • ethnicity (1) • mass / weight / height (1)	 accept gender accept race / genetic background accept BMI	**(2)** **AO2 1**

	• medical history / not on other medication (1) • lifestyle (1)	accept level of cardiovascular disease / all healthy accept level of exercise / diet / fitness	

(Total for question 5 = 11 marks)

Question number	Indicative content	Mark
* 6(a)(i)	**AO1 (6 marks)** **Stage 1** **Interphase** • longest stage of the cell cycle • DNA is replicated • more organelles are synthesised • cell grows • chemical reactions / named reactions occur **Stage 2** **Mitosis** • nucleus divides • prophase - nuclear membrane dissolves and the chromosomes condense • spindle fibres form • metaphase - the chromosomes line up on the equator • anaphase - the chromosomes are separated and pulled to the poles • telophase - the nuclear membrane reforms **Stage 3** **Cytokinesis** • the cell divides • into two genetically identical cells which have a diploid nucleus • the cells are body cells needed for growth and repair	**(6)**

Level	Mark	Descriptor
0		• No rewardable material.
Level 1	1-2	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific, enquiry, techniques and procedures lacks detail. (AO1) • Presents a description which is not logically ordered and with significant gaps. (AO1)

Level 2	3-4	• Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas, enquiry, techniques and procedures is not fully detailed and/or developed. (AO1) • Presents a description of the procedure that has a structure which is mostly clear, coherent and logical with minor steps missing. (AO1)
Level 3	5-6	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas, enquiry, techniques and procedures is detailed and fully developed. (AO1) • Presents a description that has a well-developed structure which is clear, coherent and logical. (AO1)

Additional guidance

Level	Mark	Response detail
Level 1	1-2	• a description of a process that happens during one stage of the cell cycle • linked to the name of that stage of the cell cycle
Level 2	3-4	• a description of processes that happen during two stages of the cell cycle OR a detailed description of all the steps of stage 2. • linked to the names of the stages of the cell cycle
Level 3	5-6	• a detailed description of process that happens during all three stages of the cell cycle including all of the steps of mitosis • linked to the names of the stages of the cell cycle and mitosis

Question number	Answer	additional guidance	Mark
6(a)(ii)	(cell cycle / cell division) is quick(er) / is uncontrolled / doesn't stop	accept cells split / reproduce for divide	**(1)** **AO1 1**

Question number	Answer	Mark
6(b)(i)	B differentiation **The only correct answer is B** ***A*** *is not correct because cell elongation is not part of growth in animals* ***C*** *is not correct because cell wall synthesis is not part of growth in animals* ***D*** *is not correct because transpiration is not part of growth in animals*	**(1)** **AO1 1**

Question number	Answer	additional guidance	Mark
6(b)(ii)	An answer including: • (measure the) {height / mass / head circumference} (1) • find the **percentile** (1) • for their age (1)	 accept weight ignore BMI accept (use a) **percentile** chart accept compare (measurement) with children of their age accept the idea that	**(4)** **AO2 2**

	• measurements should increase along a percentile / repeated measurements over time (1)	growth should stay on or around the same percentile	

(Total for question 6 = 12 marks)