Mark Scheme (Results)

Summer 2024

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

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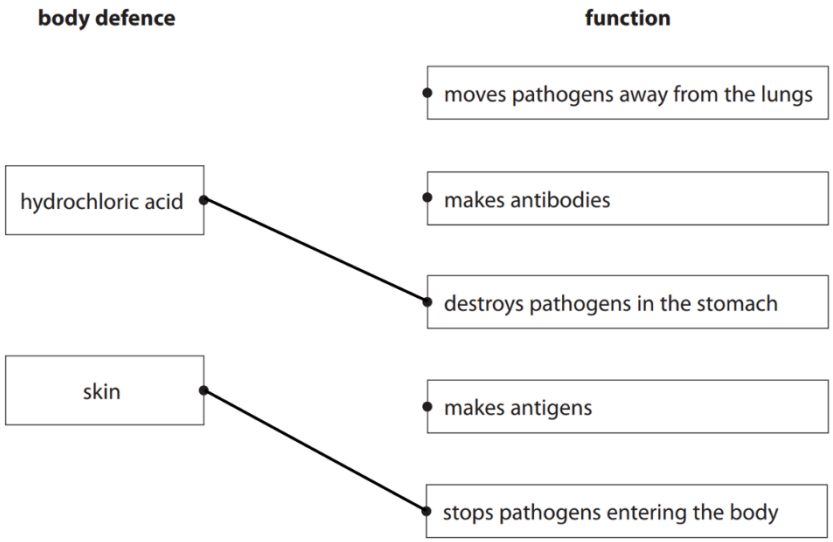
General Marking Guidance

- 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)	A cell wall **The only correct answer is A** *B is incorrect because structure W is not cytoplasm* *C is incorrect because structure W is not chromosomal DNA* *D is incorrect because structure W is not a plasmid*	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
1(a)(ii)	flagellum / tail	accept flagella accept phonetic spellings	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
1(a)(iii)	movement	accept swimming ignore references to sperm and eggs	**(1)** **AO1 1**

Question number	Answer	Mark
1(b)	 do not award mark if two lines are drawn from hydrochloric acid box do not award mark if two lines are drawn from skin box	**(2)** **AO1 1**

Question number	Answer	Additional guidance	Mark

1(c)	Any **two** from: • drinking alcohol (1) • taking drugs (1) • malnutrition / overeating / poor diet (1) • lack of exercise (1)	accept smoking other substances / vaping ignore obesity accept other named lifestyle factors	**(2)** **AO1 1**

Total marks for question 1 = 7 marks

Question number	Answer	Mark
2(a)(i)	• salt (1) • membranes (1) must be in the correct order	**(2)** **AO1 1**

Question number	Answer	Additional guidance	Mark
2(a)(ii)	A description including: • pour the contents (of the beaker) into the **funnel** (1) • (into) filter paper / to filter (it) (1) • to separate DNA (1)	 accept filtration accept separate liquid from solids pour the contents of the beaker into the filter funnel is two marks	**(2)** **AO3 1a**

Question number	Answer	Mark
2(a)(iii)	C white **The only correct answer is C** *A is incorrect because the precipitate is not blue* *B is incorrect because the precipitate is not*	**(1)** **AO1 1**

	orange *D is incorrect because the precipitate is not red*	

Question number	Answer	Mark
2(b)(i)	B 10.4 **The only correct answer is B** *A is incorrect because the range is not 13.2* *C is incorrect because the range is not 5.9* *D is incorrect because the range is not 5.3*	**(1)** **AO2 1**

Question number	Answer	Additional guidance	Mark
2(b)(ii)	6.4		**(1)** **AO1 1**

Total marks for question 2 = 7 marks

Question number	Answer	Additional guidance	Mark
3(a)	A description including **three** from: • select birds with highest egg production (1) • breed (these birds) (1) • select / breed birds (with best traits) from these offspring (1) • repeat over many generations (1)	ignore select the best chickens accept offspring inherit genes for producing more eggs accept repeat over a long time	**(3)** **AO2 1**

Question number	Answer	Mark
3(b)(i)	D diploid **The only correct answer is D** *A is incorrect because chicken body cells are not dominant* *B is incorrect because chicken body cells are not haploid* *C is incorrect because chicken body cells are not recessive*	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
3(b)(ii)	39 / thirty nine		**(1)** **AO2 1**

Question number	Answer	Mark
3(c)	<table><tr><th>type of cell produced</th><th>type of cell division</th><th>number of daughter cells produced</th></tr><tr><td>body cell</td><td>mitosis</td><td>2 (1)</td></tr><tr><td>gamete</td><td>meiosis (1)</td><td>4 (1)</td></tr></table> **Additional guidance** Accept alternative spellings of meiosis. Reject if meiosis has a 't' in it.	**(3)** **AO1**

Question number	Answer	Additional guidance	Mark
3(d)	A description including **two** from: • make (new) cells / divide (1) • differentiate / become specialised / become other (named) types of cell (1)	accept mitosis ignore stem cells are unspecialised / undifferentiated	**(2)** **AO1 1**

	• (provide new cells) {for growth / to replace (damaged) cells} (1)	ignore repair cells accept repair damaged tissues / organs	

Total marks for question 3 = 10 marks

Question number	Answer	Additional guidance	Mark
4(a)(i)	antibiotics {do not kill / inhibit} viruses / (only) {kill / inhibit} bacteria	accept antibiotics are (only) used to treat bacterial infections / the common cold is not caused by bacteria ignore fight off / get rid of bacteria	**(1)** **AO2 1**

Question number	Answer	Mark
4(a)(ii)	C clinical testing **The only correct answer is C** *A is incorrect because preclinical testing is not the last stage in the production of antibiotics* *B is incorrect because discovery is not the last stage in the production of antibiotics* *D is incorrect because discovery is not the last stage in the production of antibiotics*	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
4(b)	An explanation linking **four** from: • some bacteria have a mutation / resistant gene (1) • non-resistant bacteria are killed / the resistant bacteria survive (the antibiotic) (1) • reduces competition / resistant bacteria have more {resources / food} • the resistant bacteria reproduce (1) • pass on beneficial alleles • (eventually) all bacteria are the antibiotic-resistant / bacteria with the mutation (1)	accept allele for gene accept changes / variation in DNA ignore bacteria are immune / get rid of bacteria accept survival of the fittest accept named resources accept resistance gene accept the antibiotic will	**(4)** **AO3 1**

		no longer be effective	

Question number	Answer	Additional guidance	Mark
4(c)	fossils / (structure of) {skeletons / bones / skull / pentadactyl limb}	accept cave paintings / (stone) carvings / discovery of Ardi / Lucy ignore clothes / DNA	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
4(d)(i)	An explanation including: {tool A / newer tool} is more {refined /specialised} (1) so {more recent humans / humans that made tool A} had greater skill (1) because more recent humans were more intelligent (1)	 accept named skill accept had a larger brain	**(3)** **AO2 1**

Question number	Answer	Additional guidance	Mark
4(d)(ii)	compare with other finds (of a known age) / compare their shapes (1) depth in rock layer (1) (radiometric) dating the surrounding rocks (1)	accept compare the way the tools were made accept position in rock ignore place where they were found ignore carbon dating unless related to organic material found with tools	**(2)** **AO1 1**

Total marks for question 4 = 12 marks

Question number	Answer	Additional guidance	Mark
5(a)	• all points plotted correctly ± one small square (1) • one **curved** line drawn through all the points ± two small squares (1)	ecf accept a line of best fit for their plotted points ignore any extrapolation reject points joined dot-to-dot with straight lines / multiple lines	**(2)** **AO2 2**

Question number	Answer	Mark
5(b)(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
5(b)(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**

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

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

		ignore in the same room / use a thermometer	

Total marks for question 5 = 11 Marks

Question number	Answer	Mark
6(a)(i) overlap	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
6(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
6(b)	An explanation linking: • (the number of measles cases reported) has decreased (1)	accept herd	**(2)** **AO2 1**

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

Question number	Answer	Additional guidance	Mark
6(c)	Any **two** from: • white blood cells {kill / destroy} pathogens (1) • (WBC) produce {antibodies / antitoxins} (1) • memory lymphocytes (are produced) (1)	 accept phagocytosis accept WBCs 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
6(d)(i)	(beriberi) is not spread from person to person / is not caused by a {pathogen / named pathogen}	accept organisms for people ignore it is a	**(1)** **AO2 1**

		deficiency disease / not infectious / not contagious / it is caused by a lifestyle factor	

Question number	Indicative content	Mark
6(d)(ii)*	**AO2** path • electrical impulses travel from the skin → neurone X → neurone Y → neurone Z → muscle in the arm reflex arc detail • pricking the skin is a stimulus • (the stimulus is) detected by receptors • neurone Y / relay neurone is in the spinal cord /CNS • there are synapses between neurones • chemical transmitters are released at synapses • the muscle is the effector • the muscle contracts - this is the response • electrical impulses do not travel to the brain • the response is very fast neurones • X - sensory neurone • Y - relay neurone • Z - motor neurone	**(6)** **AO2 1**

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• The description attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. • Lines of reasoning are unsupported or unclear.
Level 2	3-4	• The description is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. • Lines of reasoning mostly supported through the application of relevant evidence.
Level 3	5-6	• The description is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. • Lines of reasoning are supported by sustained application of relevant evidence.

Level	Mark	Additional Guidance	General additional guidance The level is determined by the quality of the description of the path taken by electrical impulses in a reflex arc The mark within the level is determined by additional detail of the path and reflex
Level 1	1–2	• The answer refers to part of the path taken by electrical impulses • The response includes an additional point of detail of the path	Possible candidate response • Impulses go from the skin through X • Impulses from the skin through X to the spinal cord
Level 2	3–4	• The description of the path includes X to Y to Z • The response includes an additional point of detail of the path AND a named neurone	Possible candidate response • Impulses go through X to Y then to Z • Impulses go from the skin, through the sensory neurone to Y, which is in the spinal cord. Impulses then go to Z and on to the muscle.
Level 3	5–6	• The description of the path includes X to Y to Z and includes the names of at least two neurones OR one named neurone and reference to synapses • The response includes an additional point of detail	Possible candidate responses • Impulses go through the sensory neurone, to Y then to Z, which is a motor neurone. • Impulses go from the skin, through X, the sensory neurone. Y is a relay neurone, which is in the spinal cord. Impulses then go to Z which is a motor neurone.

Total for question 6 = 13 marks

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