OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



MARK SCHEME

WS1.1 DEVELOPMENT OF SCIENTIFIC THINKING

SCORE	PERCENTAGE
/45	%

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Question			Answer/Indicative content	Marks	Guidance
1			A ✓	1 (AO1.1)	
			Total	**1**	
2			B ✓	1 (AO1.1)	
			Total	**1**	
3		i	**Any two from:** idea it affects enzymes (action/structure) ✓ high temperature causes active site to change shape / active site denatures ✓ stops them working ✓	2 (AO1.1)	**ALLOW** enzymes are heat sensitive/denature **ALLOW** enzymes cannot bind to substrate molecules **IGNORE** cells denature **ALLOW** enzymes no longer catalyse reaction

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Question			Answer/Indicative content	Marks	Guidance
		ii	Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question. **Level 3 (5–6 marks)** Demonstrates knowledge of homeostasis. **AND** Applies knowledge of a skin mechanism for maintaining body temperature in different environments. **AND** Analyses information to comment on the effect of exposing skin. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Demonstrates knowledge of homeostasis **and** applies knowledge of a skin mechanism for maintaining body temperature in different environments. **OR** Demonstrates knowledge of homeostasis **and** analyses information to comment on the effect of exposing the skin. **OR** Applies knowledge of a skin mechanism for maintaining body temperature in different environments **and** analyses information to comment on the effect of exposing skin. *There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.* **Level 1 (1–2 marks)** Demonstrates knowledge of homeostasis. **OR** Applies knowledge of a skin mechanism for maintaining body temperature in different environments. **OR** Analyses information to comment on the effect of exposing skin.	6 (AO2 x 1.1) (AO2 x 2.1) (AO2 x 3.1a)	**AO1.1 Demonstrate knowledge and understanding of skin and homeostasis** • need to keep constant internal temperature, despite the different external temperatures • person A needs to lose heat to the environment / person B needs to reduce heat lost to the environment • person A gains heat from the environment / person B loses heat to the environment • person A will be in danger of overheating / person B will be in danger of becoming too cold. **AO2.1 Apply knowledge and understanding of the mechanisms in skin for maintaining body temperature in different environments** • cold environment reduces sweating /decreases blood flow to the skin (vasoconstriction) / shivering / body hairs rise • warm environment increases sweating / increases blood flow to the skin (vasodilation) / body hairs on skin lie flat **AO3.1a Analyse information and ideas to interpret the effect of exposing / covering skin in different environments** • person A body less covered/more exposed skin in warmer conditions increases heat loss/allows sweat to evaporate • person B body covered/less exposed skin in colder conditions reduces heat loss/stops sweat evaporating

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Question			Answer/Indicative content	Marks	Guidance
			There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant. 0 marks *No response or no response worthy of credit.*		
			Total	8	
4		i	genetic engineering / genetic modification ✓	1 (AO1.1)	ALLOW GM / Gene Therapy
		ii	worried about possible side effects / ethically / morally / religiously wrong ✓	1 (AO3.2a)	IGNORE playing God / not natural
			Total	2	
5			B ✓	1 (AO1.1)	
			Total	1	
6			B ✓	1 (AO1.1)	
			Total	1	
7			C ✓	1 (AO2.1)	
			Total	1	
8			B ✓	1 (AO2.1)	
			Total	1	

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Question			Answer/Indicative content	Marks	Guidance
9	a	i	**Any two from:** contains (plant) hormones ✓ causes excessive/rapid cell elongation/growth ✓ only affects broadleaved plants ✓	2 (AO2 x 1.1)	**ALLOW** auxins **IGNORE** just plants grow faster **ALLOW** effects some plants/weeds and not others/the crop
		ii	**B** because B causes highest percentage death of horsenettle ✓ A/C do not kill other broadleaved plants/weeds / A/C not suitable as field contains other weeds / A/C only kills horsenettle ✓ D does not kill roots / much less effective at killing horsenettle ✓ Spring treatment because buds just growing and flowering yet to happen ✓	4 (AO3.1b)	**No mark for B on its own.** **NEED a choice of B or D to score any marks** **Mark first choice** Need reference to both buds and flowering **ALLOW D** for three marks if B is not chosen first: because D kills more species of weeds ✓ D much cheaper than B ✓ spring treatment because buds just growing and flowering yet to happen ✓
	b	i	breaks seed dormancy / elongation of shoots ✓	1 (AO1.1)	**ALLOW** (stimulates) flowering/ fruit development / fruit growth / seed formation / germination / growth of shoots / seedless fruits **DO NOT ALLOW** fruit ripening / seed growth
		ii	Idea that the ripeness colour scale can be used for comparison ✓ idea that a numerical estimate/quantitative measure for level of ripeness is better / idea that it gives multiple measures and not just two/ripe or unripe / removes objectivity / allows reproducibility ✓	2 (AO2 x 3.3a)	**ALLOW** can be used to choose from a selection of ripeness levels

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Question			Answer/Indicative content	Marks	Guidance
			Total	9	
10		i	**Any four from:** plasmid used to insert the gene ✓ restriction enzyme to cut open the plasmid / for removing the gene ✓ ligase enzyme to insert the gene / join ends of gene and plasmid ✓ correct reference to sticky ends ✓ correct reference to selection using antibiotic markers ✓	4 (AO4 x 1.1)	enzyme and role must be correct link
		ii	idea (this method) does not use mice / ORA ✓ people may think original method is cruel / unethical / killing mice ✓	2 (AO2.1)	**ALLOW** does not use animals **IGNORE** references to religion/playing god etc.
		iii	to repeat the work / make sure it is reproducible ✓ to make sure it worked / was safe ✓	2 (AO2 x 1.1)	**ALLOW** make sure work was valid **ALLOW** check for errors/mistakes **ALLOW** was correct **ALLOW** was reliable **ALLOW** was ethical **ALLOW** make sure work was original / authentic **ALLOW** recognise significance of work ALLOW to improve quality of report/published work
			Total	8	

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Question			Answer/Indicative content	Marks	Guidance
11	a		idea that water is added from (each) lake to a (separate) Petri dish using (sterile) pipette ✓ filter paper/antibiotic disc is placed in (the centre of) each dish with the (sterile) forceps ✓ Petri dishes are incubated ✓ idea that the inhibition zone/clear area/area with no bacteria growth around the discs is measured ✓	4 (AO4 x 1.2)	**ALLOW** idea of repeats **ALLOW** idea of setting up a control
	b		Lake Bellandur– no mark **Any two from:** more (antibiotic) resistant bacteria / more species of bacteria are resistant to antibiotics / ORA ✓ Lower number of bacteria killed by antibiotics / less species of bacteria killed by antibiotics / ORA ✓ this lake contains a higher ratio of resistant bacteria compared to bacteria killed by antibiotics✓ (antibiotic) resistant bacteria more likely to survive/reproduce with more (antibiotic) pollution ORA✓	2 (AO2 x 3.2a)	Incorrect or no lake given then no marks **ALLOW** bacteria are more resistant (antibiotic) **DO NOT ALLOW** more resistant to bacteria **IGNORE** immune **ALLOW** only 28 species are killed **ALLOW** idea of natural selection causing increased resistant bacteria with more (antibiotic) pollution
			Total	6	

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Question			Answer/Indicative content	Marks	Guidance
12	a		idea that water is added from (each) lake to a (separate) Petri dish using (sterile) pipette ✓ filter paper/antibiotic disc is placed in (the centre of) each dish with the (sterile) forceps ✓ Petri dishes are incubated ✓ idea that the inhibition zone/clear area/area with no bacteria growth around the discs is measured ✓	4 (AO4 x 1.2)	**ALLOW** idea of repeats **ALLOW** idea of setting up a control
	b		Lake Bellandur– no mark **Any two from:** more (antibiotic) resistant bacteria / more species of bacteria are resistant to antibiotics / ORA ✓ Lower number of bacteria killed by antibiotics / less species of bacteria killed by antibiotics / ORA ✓ this lake contains a higher ratio of resistant bacteria compared to bacteria killed by antibiotics✓ (antibiotic) resistant bacteria more likely to survive/reproduce with more (antibiotic) pollution ORA ✓	1 (AO2 x 3.2a)	Incorrect or no lake given then no marks **ALLOW** bacteria are more resistant (antibiotic) **DO NOT ALLOW** more resistant to bacteria **IGNORE** immune **ALLOW** only 28 species are killed **ALLOW** idea of natural selection causing increased resistant bacteria with more (antibiotic) pollution
			Total	6	

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