



GCSE

Biology A

General Certificate of Secondary Education **A222/02**

Unit 2: Modules B4, B5, B6 (Higher Tier)

Mark Scheme for June 2010

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Question			Expected Answers	Marks	Additional Guidance
1	a	i	the maintenance of a constant internal environment (1)	[1]	OWTTE Accept 'inside body' = internal environment Ignore references to internal temperature
		ii	energy gain is the same as energy loss (1)	[1]	OWTTE Accept 'input' = gain, 'output' = loss Accept 'they are the same'/balanced Accept 'it' = energy gain
	b		receptors (1) skin (1) brain (1)	[3]	if more than three responses, deduct one mark for each additional response candidates cannot score less than zero marks accept clear indication of correct response eg use of arrows
	c		respiration (1)	[1]	more than one response = 0 marks accept a clear indication of correct response eg underlined, other options deleted, tick
			Total	[6]	

2	a			[1]	three correct lines = 1 mark more than one line from left hand boxes = 0 marks
	b		mechanism/process use of a feedback loop/changes being reversed (1) outcome (conditions kept) constant / creates a balance / (establish a) set point/normal level (1) detail within the process (created due to action of) antagonistic effectors / OWTTE (1)	[3]	accept correct scenario details for artificial systems – look for key marking points
			Total	[4]	

Question		Expected Answers	Marks	Additional Guidance
3	a	eating food (1) respiring (1)	[2]	if more than two responses – deduct 1 mark for each additional response Accept a clear indication of correct response eg. underlined, other options deleted, tick
	b	i	[1]	if more than one response = 0 marks Accept a clear indication of correct response eg. underlined, other options deleted, tick
		ii	[3]	responses must be in context of excess water ignore account of ADH under conditions of low water intake
		Total	[6]	

4	a	<table><tr><th colspan="2">description</th><th>label</th></tr><tr><td colspan="2">where the genetic code is found</td><td>A</td></tr><tr><td colspan="2">where proteins are made</td><td>B</td></tr></table>	description		label	where the genetic code is found		A	where proteins are made		B	[1]	more than one response in each box = 0 marks accept a clear indication of correct response eg use of linking arrows with diagram, correct description alongside label on diagram (A = genetic code, B = proteins) or nucleus = A, cytoplasm = B within the box																
description		label																											
where the genetic code is found		A																											
where proteins are made		B																											
	b	<table><tr><td>DNA ...</td><td></td><td></td><td></td><td></td></tr><tr><td>... strands</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>... bases</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>... bases ...</td><td>single</td><td>pairs</td><td>triplets</td><td>fours</td></tr><tr><td>shape ...</td><td>circular</td><td>cubic</td><td>helix</td><td>zig-zag</td></tr></table>	DNA strands	1	2	3	4	... bases	2	3	4	5	... bases ...	single	pairs	triplets	fours	shape ...	circular	cubic	helix	zig-zag	[3]	four rows correct = 3 marks three rows correct = 2 marks one or two rows correct = 1 mark more than one response in a row means that this row is incorrect accept any clear indication of correct response eg tick, other options crossed out, clearly underlined, shaded
DNA ...																													
... strands	1	2	3	4																									
... bases	2	3	4	5																									
... bases ...	single	pairs	triplets	fours																									
shape ...	circular	cubic	helix	zig-zag																									
		Total	[4]																										

Question			Expected Answers	Marks	Additional Guidance															
5	a		Jo and Ray (1)	[1]	two correct responses = 1 mark more than two responses = 0 marks accept responses in either order accept linking arrows to correct people on the diagram															
	b		a set of chromosomes / different genes from each parent (1)	[1]	ignore reference to 50% chromosomes/ 'information' accept alleles/DNA															
	c	i	organelles (1) eight (1)	[2]	if more than two responses, deduct 1 mark for each additional response candidate cannot score less than zero marks responses must be in the correct order accept linking arrows to correct words in list															
		ii	<table><tr><td></td><td>true</td><td>false</td></tr><tr><td>The cells no longer contain the same genes.</td><td></td><td>✓</td></tr><tr><td>Some of the genes are no longer active.</td><td>✓</td><td></td></tr><tr><td>Each cell produces only the specific proteins it needs.</td><td>✓</td><td></td></tr><tr><td>The cells form different types of tissues.</td><td>✓</td><td></td></tr></table>		true	false	The cells no longer contain the same genes.		✓	Some of the genes are no longer active.	✓		Each cell produces only the specific proteins it needs.	✓		The cells form different types of tissues.	✓		[2]	four rows correct = 2 marks three rows correct = 1 mark two or one rows correct = 0 marks accept a clear indication of correct response eg shaded, circled, crosses (if no ticks)
	true	false																		
The cells no longer contain the same genes.		✓																		
Some of the genes are no longer active.	✓																			
Each cell produces only the specific proteins it needs.	✓																			
The cells form different types of tissues.	✓																			
			Total	[6]																

Question		Expected Answers	Marks	Additional Guidance
6	a	meristem (1)	1	more than one response = 0 marks accept a clear indication of correct response eg underlined, other options deleted, tick
	b	auxin (1)	1	more than one response = 0 marks accept a clear indication of correct response eg underlined, other options deleted, tick
	c	stays the same unspecialised genes	2	three correct = 2 marks two correct = 1 mark one or zero correct = 0 marks if more than three responses – deduct 1 mark for each additional response candidate cannot score less than zero marks accept clear indication of correct response eg use of arrows
		Total	[4]	

7	a	light sensory	1	need both responses in the correct order accept clear indication of correct response eg use of arrows
	b	i	1	more than one response = 0 marks accept a clear indication of correct response eg other options crossed out, clearly underlined, shaded, circled, crosses (if no ticks)
		ii	2	ignore 'stops interference' from surrounding cells accept sends information more quickly accept a clear reference to saltatory response / jumping of impulse = increased speed of transmission
		Total	[4]	

Question		Expected Answers	Marks	Additional Guidance					
8	a	<table border="1"> <tr> <td>F</td><td>A</td><td>D</td><td>C</td><td>E</td></tr> </table>	F	A	D	C	E	2	F before A A before D D before C three correct steps = 2 marks one or two correct steps = 1 mark zero correct steps = 0 marks if B is included in overall response, continue to mark and look for sequence eg F before A
F	A	D	C	E					
	b	the sensory neuron membrane does not contain the chemical receptor (binding sites) / OWTTE (1)	1						
	c	serotonin not reabsorbed (by pre synaptic vesicles) / serotonin reabsorption site is blocked (1)	1	ignore 'serotonin stays in synapse'					
		Total	[4]						

Question			Expected Answers	Marks	Additional Guidance												
9	a		<table><tr><td>B</td><td></td><td></td></tr></table>	B			2	B before C (1 mark), C before A (1 mark) if more than two responses, deduct 1 mark for each additional response accept clear indication of correct response eg use of arrows									
			B														
			<table><tr><td>C</td><td></td><td></td></tr></table>	C													
			C														
<table><tr><td>A</td><td></td><td></td></tr></table>	A																
A																	
	b		<table><tr><td></td><td>true</td><td>false</td></tr><tr><td>The bell was used ...</td><td></td><td>✓</td></tr><tr><td>The conditioned reflex ...</td><td></td><td>✓</td></tr><tr><td>The dog learned ...</td><td>✓</td><td></td></tr></table>		true	false	The bell was used ...		✓	The conditioned reflex ...		✓	The dog learned ...	✓		2	three rows correct = 2 marks two rows correct = 1 mark one or zero rows correct = 0 marks accept a clear indication of correct response eg shaded, circled, crosses (if no ticks)
	true	false															
The bell was used ...		✓															
The conditioned reflex ...		✓															
The dog learned ...	✓																
			Total	[4]													

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