



GCE

Biology A

H020/01: Breadth in biology

Advanced Subsidiary GCE

Mark Scheme for June 2019

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

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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Annotations

Annotation	Meaning
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
()	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

Subject-specific Marking Instructions**INTRODUCTION**

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

SECTION A

Question	Answer	Marks	Guidance
1	C ✓	1	
2	D ✓	1	
3	D ✓	1	
4	D ✓	1	
5	D ✓	1	
6	A ✓	1	
7	A ✓	1	
8	A ✓	1	
9	C ✓	1	
10	A ✓	1	
11	B ✓	1	
12	A ✓	1	
13	B ✓	1	
14	D ✓	1	
15	A ✓	1	
16	B ✓	1	
17	B ✓	1	
18	B ✓	1	
19	B ✓	1	
20	C ✓	1	
	Total	20	

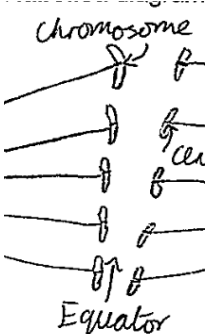
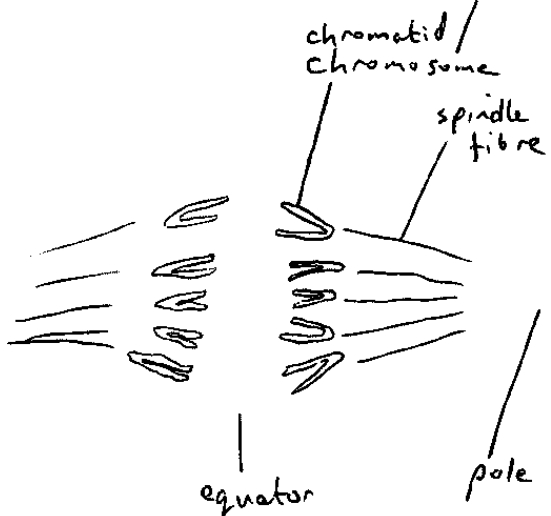
SECTION B

Question		Answer	Marks	Guidance
21	(a)	<p>table with correct results entered ✓</p> <p>LH column records letter of rod OR treatment and liquid / described ✓</p> <p>RH column records final length ✓</p> <p>correct headings (LH & RH column) with units (cm or mm) ✓</p>	max 3	<p>DO NOT ALLOW if number of decimal points wrong</p> <p>IGNORE column with % change / change in length to right</p> <p>DO NOT ALLOW if units in body of table.</p> <p>IGNORE graphical presentation</p>
	(b) (i)	<p>boiling, damages / AW, plasma / cell surface, membrane ✓</p> <p>(therefore) no, osmosis / (net) movement of water, out of A, but water moves out of E OR AW ✓</p>	2	<p>Examples of AW: disrupts / destroys / melts / denatures proteins in</p> <p>Note: needs a comment about both A & E for this mark</p>
	(b) (ii)	<p>ethanol dissolves phospholipid (bilayer) ✓</p> <p>(therefore) no, osmosis / (net) movement of water into D, but water moves into F OR AW ✓</p>	2	<p>Note: needs a comment about both D & F for this mark</p>
	(c)	<p>use more, accurate / precise apparatus / described OR</p>	1	

Question		Answer	Marks	Guidance
		use calipers / micrometer ✓		
Total			8	

Question		Answer	Marks	Guidance
22	(a)	C B G F D ✓✓✓	3	Five correct answers 3 marks Four correct answers 2 marks Three or two correct answers 1 mark
	(b)	(i)		
		set to zero absorbance using blank / (distilled) water ✓	1	ALLOW set to 100% transmission using water
		(ii)		
		idea that values are, all measured to the same standard / comparable / accurate / valid ✓	1	ALLOW reduce systematic error / AW
Total			5	

Question		Answer	Marks	Guidance
23	(a)	(i)		
		R, Q, S, P ✓	1	
		(ii)		
		<u>chromosomes / centromeres</u> , aligning on, equator / mitotic plate / metaphase plate (of cell) ✓ <u>chromatids</u> either side of, equator / mitotic plate / metaphase plate ✓ spindle fibres attaching to, chromosome / centromere / pole / centriole ✓	max 2	ALLOW centre / middle, of cell in mp 1 & 2 ALLOW microtubules for spindle fibres

Question	Answer	Marks	Guidance
(b)	<p>diagram showing at least 5 chromosomes pulled to each side with spindle fibres shown ✓</p> <p>all labelling lines drawn with ruler and no arrows and end at structures ✓</p> <p>two correct labels from chromatid, chromosome, equator, spindle (fibres), microtubules, pole, (position of) centriole, cytoplasm ✓</p>	max 3	<p>DO NOT ALLOW if chromosomes vertically aligned e.g.</p>  <p>Example of correct diagram:</p> 

Question		Answer	Marks	Guidance
	(c)	190 ✓✓	max 2	If the answer is incorrect or incorrectly rounded, award 1 mark for working: $42 \div 265 \times 1200$ OR $42 \div 265 \times 20 \times 60$
			Total	8

Question		Answer	Marks	Guidance
24	(a)	70 ✓✓ (root hairs) mm ⁻² ✓	3	ALLOW 35 two marks for correct answer ALLOW one mark if not given to 2 s.f. if answer incorrect ALLOW one mark for correct surface area calculated (6.28 - 6.284 or 12.56 -12.57) ALLOW / mm ²
	(b)	12.1 ✓✓✓	3	<i>Max 2 if answer not given to 1 decimal place.</i> If answer is incorrect ALLOW 1 mark for evidence of correct mean calculation: 36 or 36.2
	(i)	(students) (unpaired) t-test ✓	1	DO NOT ALLOW paired t-test
	(ii)	A vessel wall ✓ B (vessel) lumen ✓ C (bordered) pit ✓	3	ALLOW 'lignified wall' DO NOT ALLOW 'cell'
	(c)	(i)	max 1	DO NOT ALLOW larger / higher surface area to volume ratio IGNORE refs to support
		large surface area to volume ratio ✓ idea that distance, water / mineral (ions), need(s) to travel is short ✓		
		Total	11	

Question			Answer	Marks	Guidance
25	(a)	(i)	<u>disulfide</u> ✓	1	
		(ii)	<u>α-helix</u> ✓	1	DO NOT ALLOW a-helix
		(iii)	<u>quaternary</u> ✓	1	
	(b)	(i)	peptidoglycan / murein ✓	1	
		(ii)	<u>glycosidic</u> ✓ <u>water</u> ✓	2	IGNORE H ₂ O
	(c)	(i)	<i>At higher temperature / 60°C</i> more kinetic energy therefore more, successful collisions / ESC formed ✓ initial rate (of reaction) faster ✓ enzyme (eventually) denatured and, less product formed / reaction stopped earlier / not all substrate reacted ✓	max 2	ORA for 37°C ALLOW description of denatured
		(ii)	<i>At lower temperature / 25°C</i> less kinetic energy therefore less, successful collisions / ESC formed ✓ rate (of reaction) slower / taking more time for product to be formed ✓ not all substrate reacted (after 60 min) ✓	max 2	ORA for 37°C ALLOW reaction not complete (in 60 min) ALLOW substrate (concentration) does not become limiting (in 60 min) IGNORE Ref to amount of product formed
			Total	10	

Question		Answer	Marks	Guidance
26	(a)	antigens ✓ interleukins ✓ mitosis ✓ plasma ✓ antibodies ✓	5	
	(b)	antibodies not used / should say antigens used ✓ not natural (immunity) / should say artificial (immunity) ✓ not passive (immunity) / should say active (immunity) ✓	3	IGNORE refs to attenuated pathogen
		Total	8	

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