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.

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**	

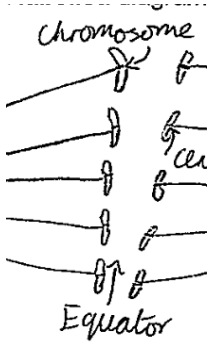
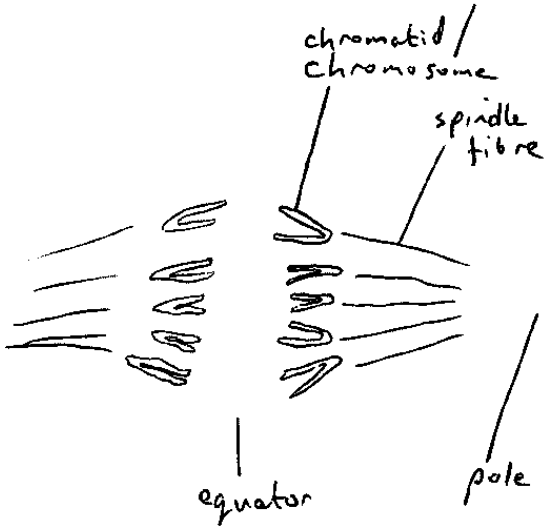
SECTION B

Question			Answer	Marks	Guidance
21	(a)		table with correct results entered ✓ LH column records letter of rod OR treatment and liquid / described ✓ RH column records final length ✓ correct headings (LH & RH column) with units (cm or mm) ✓	max 3	**DO NOT ALLOW** if number of decimal points wrong **IGNORE** column with % change / change in length to right **DO NOT ALLOW** if units in body of table. **IGNORE** graphical presentation
	(b)	(i)	boiling, damages / AW, plasma / cell surface, membrane ✓ (therefore) no, osmosis / (net) movement of water, out of A, but water moves out of E **OR** AW ✓	2	Examples of AW: disrupts / destroys / melts / denatures proteins in Note: needs a comment about both A & E for this mark
	(b)	(ii)	ethanol dissolves phospholipid (bilayer) ✓ (therefore) no, osmosis / (net) movement of water into D, but water moves into F **OR** AW✓	2	Note: needs a comment about both D & F for this mark
	(c)		use more, accurate / precise apparatus / described **OR**	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)		diagram showing at least 5 chromosomes pulled to each side with spindle fibres shown ✓ all labelling lines drawn with ruler **and** no arrows **and** end at structures ✓ **two** correct labels from chromatid, chromosome, equator, spindle (fibres), microtubules, pole, (position of) centriole, cytoplasm ✓	**max 3**	**DO NOT ALLOW** if chromosomes vertically aligned e.g.  Example of correct diagram: 

Question			Answer	Marks	Guidance
	(c)		190 ✓✓	max 2	**If the answer is incorrect or incorrectly rounded, award 1 mark for working:** 42÷265 x1200 **OR** 42÷265 x20 x60
			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)	(i)	12.1 ✓✓✓	3	*Max 2 if answer not given to 1 decimal place.* If answer is incorrect **ALLOW** 1 mark for evidence of correct mean calculation: 36 or 36.2
		(ii)	(students) (unpaired) t-test ✓	1	**DO NOT ALLOW** paired t-test
	(c)	(i)	A vessel wall ✓ B (vessel) lumen ✓ C (bordered) pit ✓	3	**ALLOW** 'lignified wall' **DO NOT ALLOW** 'cell'
		(ii)	large surface area to volume ratio ✓ idea that distance, water / mineral (ions), need(s) to travel is short ✓	max 1	**DO NOT ALLOW** larger / higher surface area to volume ratio **IGNORE** refs to support
			Total	11	

Question			Answer	Marks	Guidance
25	(a)	(i)	disulfide ✓	1	
		(ii)	α-helix ✓	1	**DO NOT ALLOW** a-helix
		(iii)	quaternary ✓	1	
	(b)	(i)	peptidoglycan / murein ✓	1	
		(ii)	glycosidic ✓ water ✓	2	**IGNORE** H_2O
	(c)	(i)	*At higher temperature / 60 ^oC* 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^{o}C **ALLOW** description of denatured
		(ii)	*At lower temperature / 25 ^oC* 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^{o}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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