OCR
Oxford Cambridge and RSA

GCE

Biology A

Unit **H020/01:** Breadth in biology

Advanced Subsidiary GCE

Mark Scheme for June 2018

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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.

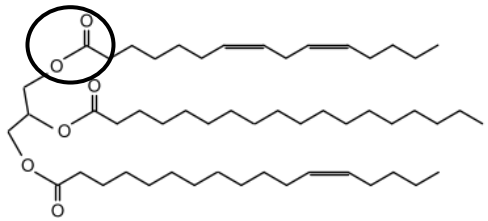
Question			Answer	Mark	Guidance
1	C		✓	1	
2	D		✓	1	
3	C		✓	1	
4	A		✓	1	
5	D		✓	1	
6	B		✓	1	
7	B		✓	1	
8	A		✓	1	
9	A		✓	1	
10	B		✓	1	
11	A		✓	1	
12	A		✓	1	
13	D		✓	1	
14	C		✓	1	
15	C		✓	1	
16	B		✓	1	
17	C		✓	1	
18	D		✓	1	
19	C		✓	1	
20	B		✓	1	**ALLOW** G1

Question			Answer	Mark	Guidance
21	(a)		Telmatobius ✓	1	must be written with a capital T note: the spelling must be correct **DO NOT ALLOW** if species name included
	(b)		(good) solvent ✓ high specific heat (capacity) / temperature stability OR described ✓ (high) density (so frog floats / buoyant) ✓ ice is less dense than water ✓	2 max	**ALLOW** it has <u>oxygen</u> dissolved in it **IGNORE** 'high heat capacity', 'no temperature change', **IGNORE** 'specific latent heat'
	(c)	(i)	large / increase the, surface area / SA:Vol ratio ✓ *idea of*: increase (the rate of) oxygen absorption / described ✓ oxygen levels in the lake are low ✓	2 max	**ALLOW** 'for oxygen absorption' if mp1 given e.g. of description: 'for (more) oxygen to diffuse in (through skin)'

Question			Answer	Mark	Guidance
		(ii)	**D** large surface area ✓ **E** for (maximum) diffusion ✓ **D** squamous, epithelium / cells OR alveolar wall, only 1 cell thick / thin ✓ **E** (providing) a short diffusion distance ✓ **D** good, blood supply / ventilation ✓ **E** maintaining / creating a (steep) concentration gradient ✓	2 max	Mark first **D** response or **E** response only For two marks the **E** mark must be linked to the **D** mark **IGNORE** increase surface area, ref to SA:Vol ratio **ALLOW** idea of more or faster diffusion
	(d)	(i)	repeat (readings) ✓ calculate mean ✓ identifying anomalies ✓ use statistical test to identify difference ✓	2 max	 this could be mean distance/size of colourless area, or mean time if cube allowed to go completely colourless **ALLOW** calculate standard deviation

Question			Answer	Mark	Guidance
		(ii)	cube A = 0.6 (: 1) ✓ cube B = 1.5 (: 1) ✓	2	**ALLOW** 1 mark for 600 : 1000 **and** 96 : 64 6 : 10 **and** 3 : 2 3 : 5 **and** 3 : 2 (as correct ratios but not expressed correctly) Allow these ratios if written anywhere in the answer space. **DO NOT ALLOW** if units given

		(iii)	large(r) organism has small(er) SA : Vol ratio ✓
			
			(rate of) diffusion (too) slow /
			diffusion distance (too) long ✓
			
			for (sufficient), delivery / uptake of, oxygen / nutrients
			OR
			for (sufficient) removal of (named) waste products ✓
			
			for, (aerobic) respiration / metabolic demands ✓
				3 max	**ALLOW ORA** for first three mark points

Question			Answer	Mark	Guidance
22	(a)		any appropriate bond circled ✓	1	 Accept more than one correct circle Circle should include both O atoms and the C between them
	(b)		glycerol ✓	1	
	(c)	(i)	energy source for respiration / respiratory substrate ✓ energy storage ✓ thermal insulation ✓ electrical insulation ✓ buoyancy ✓ *idea of:* (physical) protection ✓	3 max	**DO NOT ALLOW** energy for respiration **IGNORE** for warmth unless linked to insulation e.g protection around kidneys
		(ii)	fewer hydrogens / more double bonds / less saturated, gives lower melting point ✓ (fewer hydrogens / less saturated) more kinked, chain / molecule ✓ (molecules) less uniformly packed together (so lower temperature needed for melting) ✓	2 max	**One mark** for description (1st mark point) **One mark** for explanation. Note mp1 only awarded for clear statement of trend not for full description of data **DO NOT ALLOW** hydrogen, ions / bonds / molecules
		(d)	they / fatty acids, hydrophobic / described ✓ phospholipid bilayer (formed) ✓ fatty acids / tails, on the inside / pointing inwards ✓	2 max	**ALLOW** marks in suitably annotated diagram

Question			Answer	Mark	Guidance
23	(a)		350, (x / times) ✓✓	2	**ALLOW** range 333(.33) - 350 x scale bar = 21mm max.1 working mark for: 21mm / 0.06mm or 21 000µm / 60µm Note: candidate may measure size of photo (image size) and calculate size of object using the scale bar. If calculated correctly this gives an answer very close to 350. Allow 2 marks.
	(b)	(i)	(similar) cells working together with, common / same / similar, (named) function ✓	1	Need to see both 'working together' **and** 'same function' The named function must be storage of starch or photosynthesis
		(ii)	Q is phloem ✓ S is xylem ✓	2	
	(c)		cambium / meristem(atic)	1	

Question			Answer	Mark	Guidance
24	(a)	(i)	deoxyribose ✓	1	
		(ii)	phosphodiester ✓	1	
	(b)		*both have:* a pentose (sugar) ✓ adenine (base) ✓ phosphodiester bond (between sugar and phosphate) ✓ an OH group on carbon 3 of the sugar ✓ phosphate (group) ✓ *ATP has:* two additional phosphates ✓ deoxyribose replaced by ribose ✓ an OH group on carbon 2 of the, sugar / ribose	4 max	Mark first two similarities and first two differences **IGNORE** both have N, C, H, O, NO_3^- **DO NOT ALLOW** phosphate ion / molecule (but penalise only once) **ALLOW ORA** for DNA nucleotide **DO NOT ALLOW** 'ATP has ribose' without comparison

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>25</td><td>(a)</td><td></td><td>continuous ✓</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>use a microscope ✓
use a graticule / calibrate ✓
count number hairs per (unit) area ✓
repeat (measurements on same leaf) ✓
calculate mean (leaf hair density) ✓
divide by area used (to calculate density) ✓</td><td>3 max</td><td>e.g. calculate the area of view

ALLOW calculate mean average</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>differences completed correctly ✓

squares of differences completed correctly ✓</td><td>2</td><td>IGNORE all negative signs in Difference of ranks column

DO NOT ALLOW negatives in Difference squared column

ALLOW ECF for mp 2

<table>
<tr><th>Rank of hair density</th><th>Difference in ranks (d)</th><th>Difference squared (d^2)</th></tr>
<tr><td>2</td><td>2</td><td>4</td></tr>
<tr><td>1</td><td>0</td><td>0</td></tr>
<tr><td>7</td><td>0</td><td>0</td></tr>
<tr><td>10</td><td>0</td><td>0</td></tr>
<tr><td>4</td><td>4</td><td>16</td></tr>
<tr><td>3</td><td>0</td><td>0</td></tr>
<tr><td>8</td><td>1</td><td>1</td></tr>
<tr><td>6</td><td>0</td><td>0</td></tr>
<tr><td>9</td><td>(-)7</td><td>49</td></tr>
<tr><td>5</td><td>0</td><td>0</td></tr>
</table></td></tr>
</table>

Question			Answer	Mark	Guidance
		(ii)	r_s = 0.576 / 0.58 ✓✓	2	**ALLOW** ECF from table **ALLOW** one mark for working e.g. $n(n^2-1) = 990$ ✓ 6x70/10(99) ✓ 0.57 = one mark (incorrect rounding) 0.580 = one mark (for incorrect rounding) 0.6 = one mark (rounding too far)
	(d)	(i)	further away from the river less water (available) / ORA ✓ transpiration causes water loss ✓ hairs, trap water vapour / reduce transpiration / reduce loss of water (vapour)✓ reduced water (vapour) potential gradient from inside to outside leaf ✓	2 max	**DO NOT ALLOW** 'further from source' 'no source' **DO NOT ALLOW** hairs prevent water (vapour) loss
		(ii)	same / similar, size / age, trees ✓ same / similar, size / age, leaves ✓ repeated leaves from each tree **and** calculate mean ✓ record results at same, time of year / day ✓ ensure leaves selected are from, same side / same height / evenly distributed around tree ✓ systematic sampling / sample at set distances (from river) / described ✓	3 max	
	(e)		their conclusion is incorrect ✓ reject (the student's), hypothesis / H_1 ✓ there is no, relationship / correlation, (between leaf hair density and distance from river) / the pattern seen is due to chance ✓	2 max	 **ORA** accept the null hypothesis / H_0

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