Oxford Cambridge and RSA

GCE

Biology B

H022/01: Foundations of biology

Advanced Subsidiary GCE

Mark Scheme for November 2020

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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

Annotation	Meaning
	correct response
	incorrect response
BOD	benefit of the doubt
NBOD	benefit of the doubt **not** given
ECF	error carried forward
^	information omitted
I	ignore
BP	Blank page
	Marking point partially met
	Underline (for ambiguous / contradictory wording)
CON	contradiction

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	AO element	Guidance
1	C	**1**	AO1.1	
2	B	**1**	AO1.2	
3	B	**1**	AO2.8	
4	C	**1**	AO2.8	
5	B	**1**	AO1.2	
6	A	**1**	AO1.1	
7	C	**1**	AO1.1	
8	B	**1**	AO1.1	
9	D	**1**	AO2.5	
10	A	**1**	AO2.8	
11	D	**1**	AO2.5	
12	A	**1**	AO1.2	
13	C	**1**	AO1.2	
14	A	**1**	AO2.1	
15	B	**1**	AO2.4	
16	B	**1**	AO1.1	
17	C	**1**	AO1.1	
18	D	**1**	AO2.1	
19	B	**1**	AO2.1	
20	A	**1**	AO1.1	
	Total	**20**		

Question			Answer	Marks	AO element	Guidance
21	(a)		*idea that* mass lost may not be just water ✓ some water used by plants e.g. for photosynthesis ✓	2	AO3.1	**IGNORE** references to the accuracy of the balance **IGNORE** references to water lost to atmosphere
	(b)	(i)	number / surface area , of leaves on cutting ✓ (as) increase in surface area would increase , transpiration / number of stomata ✓ **OR** (thick) waxy cuticle (on leaf surface) ✓ waterproofs the leaf / prevents water loss ✓ **OR** number / size , of stomata ✓ affects , diffusion / evaporation , (of water) from mesophyll cells ✓	2 max	AO2.7	**explanation must be linked to factor** **IGNORE** surface area : volume **ALLOW** ORA for decrease
	(b)	(ii)	*potometer* measures water uptake ✓ times how long it takes for air bubble to travel fixed distance ✓ *advantages* transpiration measurements taken over shorter time scale ✓ *disadvantages* more difficult to set up ✓ needs to be checked regularly / cannot be left for a long time ✓	4 max	AO3.4	**ALLOW** ora advantages and disadvantages for method in **Fig.21.1** **ALLOW e.g.** measure distance travelled by air bubble in fixed time **e.g.** calculates the rate of movement of the air bubble **ALLOW e.g**. difficult to ensure no air bubbles

Question			Answer	Marks	AO element	Guidance
	(c)	(i)	plants could have lost mass due to leaf loss ✓ AVP ✓	1 max	AO3.1	**IGNORE** ref to human error **e.g.** evapotranspiration **e.g.** stomata may have closed in secondary data set **e.g.** different plant species used
		(ii)	56.5 (%) ✓ ✓	2	AO2.8	**If answer incorrect** **ALLOW** 1 mark for incorrect sig. figs e.g. 56.52 or 57 (%) **OR** for (0.36-0.23) ÷ 0.23
	(d)	(i)	stoma **Y** is open / stoma **X** is closed ✓ *stoma **Y*** guard cells are turgid ✓ lower water potential in guard cell (cytoplasm) ✓ water moves into guard cell by , osmosis / down water potential gradient ✓	3 max	AO2.3	**ALLOW** ora for stoma **X**
	(d)	(ii)	(length) 10 / 11 / 12 / 13 ✓✓ (unit) micrometer or μm ✓	3	AO2.4	**If answer incorrect** **ALLOW** 1 mark for incorrect sig. figs. e.g. 12.5 **OR** correct calculation e.g. 20 mm ÷ 2000
			Total	17		

SECTION B

Question			Answer	Marks	AO element	Guidance
22	**(a)**	**(i)**	immune system responds to harmless substance ✓ produces antibodies to , allergen / antigen ✓ inflammatory response triggered ✓	**2 max**	AO1.1	**ALLOW** harmless antigen **ALLOW** e.g. causes itching / inflammation
		(ii)	Any **two** for **1 mark:** dust mites ✓ animal hair ✓ mould / fungal spores ✓ (named) food ✓	**1 max**	AO1.1	
	(b)		*supporting statements* 100% asthmatic sufferers showed sensitivity to allergens by age 24 ✓ *idea that* as age increases there is increasing allergen sensitivity amongst asthmatics ✓ *idea of* correlation between asthma and allergen sensitivity ✓ *negative statements* other factors e.g. gender not considered ✓ correlation does not mean causal ✓	**4max**	AO3.4	
	(c)		*Chronic condition* (asthma is) long-term / slow onset ✓ inflammation is chronic ✓ *Acute condition* (asthma is) short lasting / sudden onset ✓ (asthma) attack , bronchial spasm , is acute ✓	**3 max**	AO1.1	
			Total	**10**		

Question			Answer	Marks	AO element	Guidance
23	(a)		small / reduced volume of , left ventricle ✓ small / narrow , aorta ✓ small(er) valves on left side ✓	2 max	AO2.1	**ALLOW** named valves
	(b)	(i)	*suggestion* reduced cardiac output **OR** increased heart rate / tachycardia **OR** heart attack ✓ *reason* lack of , oxygen / nutrients , to , heart / cardiac , muscle ✓	2	AO1.2	
	(b)	(ii)	shortens diffusion distance ✓ allows organisms to grow larger ✓ moves substances quickly ✓	2 max	AO1.1	**ALLOW** named substances
			Total	6		

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>AO element</th><th>Guidance</th></tr>
<tr><td>24</td><td>(a)</td><td></td><td>
<table>
<tr><th>Stage</th><th>Reason</th><th></th></tr>
<tr><td>ultrasound</td><td>locates position of , fetus / placenta</td><td>✓</td></tr>
<tr><td>addition of colchicine</td><td>stops mitosis</td><td>✓</td></tr>
<tr><td>addition of a fluorescent stain</td><td>allows chromosomes to be seen</td><td>✓</td></tr>
</table>
</td><td>3</td><td>AO1.2</td><td>One mark per row

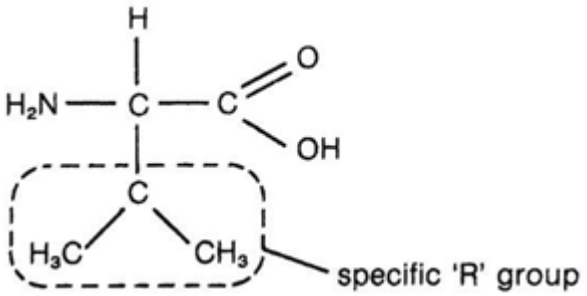
ALLOW AW e.g.so fetus does not get damaged when needle inserted</td></tr>
<tr><td></td><td>(b)</td><td></td><td>photograph is taken and cut ✓
chromosomes are put in pairs ✓
chromosomes put in order (of size) ✓</td><td>2 max</td><td>AO2.1</td><td>ALLOW e.g. produce computerised image
ALLOW e.g. chromosomes in image are rearranged into pairs using computer for two marks</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>abnormality seen on ultrasound scan ✓

family history of (named) syndrome caused by chromosomal mutation ✓
first baby has (named) syndrome ✓

reason for needing to know sex of baby ✓</td><td>2 max</td><td>AO2.1</td><td>ALLOW e.g. ultrasound scan shows need for further investigation
ALLOW (named) e.g. Down’s syndrome

ALLOW (named) e.g. Down’s syndrome

e.g. family history of genetic disorder affecting males</td></tr>
<tr><td></td><td>(c)</td><td>(ii)</td><td>amniocentesis can be done at 15 weeks ✓
less chance of miscarriage than CVS ✓
less chance of causing fetal deformities than CVS ✓</td><td>2 max</td><td>AO2.1</td><td>CVS or chorionic villus sampling only needs to be mentioned once for MP2 and 3</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>9</td><td></td><td></td></tr>
</table>

Question			Answer	Marks	AO element	Guidance
25	(a)		globular ✓ quaternary ✓ prosthetic ✓ iron ion ✓ complementary ✓	5	AO1.1	**ALLOW** Fe ion / Fe^{2+}/ Fe^{3+} **DO NOT ALLOW** Fe^{+}
	(b)	(i)	**Both needed for 1 mark** *Reaction* hydrolysis *Bond* peptide ✓	1	AO1.1	
	(b)	(ii)	All three correct = 2 marks Any two correct = 1 mark H (atom) NH_2 COOH ✓ ✓	2	AO2.1	**Two marks for complete drawing as example** 
			Total	8		

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