OCR
Oxford Cambridge and RSA

…day June 20XX – Morning/Afternoon

Cambridge OCR Level 3 Advanced Subsidiary GCE in Biology B (Advancing Biology)
H022/01 Foundations of biology

SAMPLE MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 70

This document consists of 16 pages

MARKING INSTRUCTIONS

PREPARATION FOR MARKING

SCORIS

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris assessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to scoris and mark the **required number** of practice responses ("scripts") and the **required number** of standardisation responses.

YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the scoris 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the scoris messaging system.

5. Work crossed out:

   a. where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks

   b. if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.

7. There is a NR (No Response) option. Award NR (No Response)

   - if there is nothing written at all in the answer space
   - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
   - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question.

   Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).

8. The scoris **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**

   If you have any questions or comments for your Team Leader, use the phone, the scoris messaging system, or email.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. **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

11. **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.

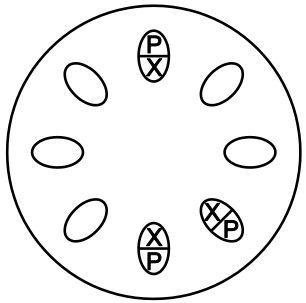
You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New 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	A	1	
3	C	1	
4	B	1	
5	C	1	
6	B	1	
7	A	1	
8	C	1	
9	B	1	
10	B	1	
11	C	1	
12	D	1	
13	B	1	
14	A	1	
15	D	1	
16	B	1	
17	A	1	
18	C	1	
19	C	1	
20	C	1	
	Total	**20**	

SECTION B

Question			Answer	Marks	Guidance
21	(a)		vascular bundles drawn with both tissues **AND** arranged in a circle just inside the circle ✓ bundle to have phloem / P on the outside and xylem / X on the inside ✓	2	 Fig 21.1
	(b)	(i)	xylem contains, xylem vessels (tracheids / fibres), phloem contains, sieve tube (elements) and companion cells ✓	1	**ALLOW** xylem has lignin, phloem does not
		(ii)	xylem has cellulose and lignin, phloem has cellulose ✓	1	
	(c)		*idea that* water can diffuse directly into the leaves ✓ *idea that* stems / AW, more flexible / can move with the currents / less likely to be broken by water movement ✓	2	**IGNORE** references to 'not needing' a cuticle as the question asks for the advantages **IGNORE** references to 'not needing' xylem as the question asks for the advantages
			Total	6	

Question			Answer	Marks	Guidance
22	(a)		1 cm^3 / 0.004 mm^3 = 1 000 mm^3 / 0.004 mm^3 = 250 000 ✓ 250 000 x 15 = 3 750 000 ✓ 3 750 000 x 200 = 750 000 000 ✓	3	**ALLOW** 3 marks for the correct answer if no working shown **ALLOW** 750 million / 7.5 $x10^8$
	(b)		*Property*: solvent ✓ *Significance*: transport polar chemicals ✓ *Property*: high specific heat capacity ✓ *Significance*: maintenance of stable temperature ✓	4	 **ALLOW** description of high specific heat capacity
			Total	7	

Question			Answer	Marks	Guidance
23	(a)		down a concentration gradient / AW, between vacuole and, surroundings / AW ✓ across tonoplast **and** cell surface membrane ✓ through the cell wall ✓	3	**ACCEPT** a description e.g. ref. to a high concentration in the vacuole compared to outside the beetroot cell
	(b)		9.51 ✓ results at 40^{o}C are the most precise and results at 20^{o}C are least precise ✓ precision increases as temperature increases ✓ quotes data to support either statement ✓	4	
	(c)		*Any 2 limitations and improvements up to maximum 4 marks* approximate length of visking tubing ✓ exactly 6 cm length of visking tubing ✓ half fill the model cell ✓ use exact volume of liquid ✓ blot dry the outside of the tubing ✓ thoroughly dry the tubing ✓ concentration of, potassium iodide solution / starch solution not stated ✓ use the same / known concentrations for each repeat / temperature ✓	4	Improvement must be linked to limitation

Question			Answer	Marks	Guidance
	(d)		**Any 1 from:** facilitated diffusion ✓ active transport ✓	**1**	
			Total	**12**	

Question			Answer	Marks	Guidance
24	(a)		**Any 2 from:** *idea that* mammal has a small surface area to volume ratio / mass transport system provides a large surface area to volume ratio ✓ high activity levels ✓ high metabolic rate ✓ (as they are) multicellular ✓	**2**	
	(b)		**A** prevents the backflow of blood into the (right) ventricle during diastole ✓ **B** prevents the backflow of blood into the (left) atrium during ventricular systole ✓	**2**	
	(c)		**Any 2 from:** (nurse) listens for pulse ✓ start of sound indicates systole pressure ✓ absence of sound indicates diastole pressure ✓	**2**	
	(d)		**Any 3 from:** diastolic blood pressure has little effect on the number of deaths ✓ low systolic blood pressure (<140) has little effect on the number of deaths ✓ high systolic blood pressures (>140) significant increase in the number of deaths observed ✓ at low systolic, increasing diastolic has little effect / AW ✓ at high systolic, increasing diastolic has great effect / AW ✓ correct quotation of figures in support of any statement ✓	**3**	
			Total	**9**	

Question			Answer	Marks	Guidance
25	(a)		**Any 2 from:** two identical molecules / helices, (of DNA) produced ✓ (each made up of) 1, original / parent / old, strand and one new strand ✓ original / parent / old, strands, act as template / described ✓	2	
	(b)		**Any 2 from:** 30% adenine ✓ (135 million x 2) = 270 million / 100) x 30 ✓ 81 million ✓	2	**ALLOW** correct answer with no working for 2 marks **ALLOW** 270 000 000 x 0.3 **ALLOW** 1 mark for (135 million / 100) x 30 = 40.5 million
	(c)	(i)	*Arabidopsis lyrata* ✓	1	
		(ii)	*Theobroma cacao* ✓	1	
		(iii)	5 ✓	1	
			Total	7	

Question			Answer	Marks	Guidance
26	(a)	(i)	tuberculin is injected under the skin ✓ raised hard area after 48–72 hours ✓	2	**ALLOW** antigen under skin
		(ii)	*Agglutinins* *idea of* the antigen binding site / variable region binding to the antigens and clumping the pathogens together ✓ *Opsonins* *idea of* the constant region of the antibody allows phagocytic cells to recognise and engulf ✓	2	
	(b)	(i)	**Any 3 from:** amino acid sequence gives complementary shape to antigen ✓ variable region specific to antigen on cancer cells ✓ chemotherapeutic agent attached to antibody ✓ (Antibody Drug Conjugate) floats in the bloodstream sticking only to cancer cells ✓ once attached, the agent kills the cancer cell ✓ direct attachment of antibodies to cancer cells ✓ (monoclonal antibody) marks cancer cell for destruction ✓ antibodies attach to T cells to stimulate them to attack cancer cells (by keeping them switched on) ✓	3	**ALLOW** toxin/drug is attached to the antibody
		(ii)	**Any 2 from:** may encourage unprotected sex ✓ requires parental consent ✓	2	

Question			Answer	Marks	Guidance
			does not consider the child's point of view ✓ vaccines can have side effects ✓		
			Total	**9**	

Summary of updates

Date	Version	Change
January 2019	2.0	Addition to the rubric clarifying the general rule that working should be shown for any calculation questions
July 2024	2.1	Removed watermark.
March 2026	2.2	Withdrawal information of qualification including final first teach date and final assessment opportunity date.