OCR
Oxford Cambridge and RSA

…day June 20XX–Morning/Afternoon

AS Level Biology A

H020/02 Depth in biology

SAMPLE MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 70

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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.

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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.

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10. For answers marked by levels of response:

- Read through the whole answer from start to finish.
- Decide the level that **best fits** the answer – match the quality of the answer to the closest level descriptor.
- To select a mark within the level, consider the following:

  Higher mark: A good match to main point, including communication statement (in italics), award the higher mark in the level
  Lower mark: Some aspects of level matches but key omissions in main point or communication statement (in italics), award lower mark in the level.

Level of response questions on this paper are **4(b)** and **5(b)**.

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11. **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

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12. **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.

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Question			Answer	Marks	Guidance
1	(a)		lamella ✓	1	**ALLOW** lamellae.
	(b)		*three from* many / AW, lamellae / structure A, provide large surface area ✓ (presence of) secondary lamellae on main lamellae provide large surface area ✓ short distance between blood and, water / outside ✓ idea that blood maintains diffusion gradient ✓ *any of above linked to* faster diffusion (of oxygen, carbon dioxide) ✓	4	**ALLOW** only if linked to another marking point. **IGNORE** refs to squamous cells as not visible on Fig. 1.1.
	(c)		*three from* tissue has, one / few, types of cell **and** performs, one / few, functions ✓ *idea that* bone has, one / few, types of cell **or** *idea that* bone performs, one / few, functions ✓ organs consist of several tissues ✓ gills contain two or more **named** tissues ✓	3	**ALLOW** bone, blood, epithelial, connective.
			Total	8	

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Question			Answer	Marks	Guidance
2	(a)	(i)	32 ✓ mmol dm^{-3} min^{-1} ✓	2	**ALLOW** mmol dm^{-3} / min' or 'mmol dm^{-3} per , min / minute **ALLOW** 0.53 mmol dm^{-3} / s
		(ii)	(initial rate likely to be) greater ✓ *because…* higher concentration of, substrate / amylose, molecules (at start) ✓ more chance of, substrate / AW, entering <u>active site</u> ✓	3	**ALLOW** 'starch'
	(b)	(i)	*three from* competes (with substrate) / competitive ✓ enters / fits in / binds to / blocks, active site ✓ prevents substrate from entering active site ✓ (binds to active site) temporarily ✓	3	
		(ii)	(at high substrate concentration) rate approaches rate in absence of inhibitor ✓	1	**IGNORE** idea that increased substrate concentration overcomes the inhibition as answer must refer to evidence from the graph.
	(c)	(i)	*three from* specify volume of starch and amylase to be added to the tubes ✓ specify volume (in ml) of the solution that should be removed for testing ✓ stir before taking the sample ✓ test with iodine ✓ all carried out at same temperature ✓	3	

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Question			Answer	Marks	Guidance
		(ii)	*four from* ionic / hydrogen, bonds, disrupted / broken ✓ (by) high concentration of, hydrogen ions / H^+ ✓ tertiary structure / shape of active site, changed ✓ substrate no longer fits into active site ✓ (enzyme) denatured ✓	4	**IGNORE** active site denatured.
		(iii)	*Evaluation, two from* idea that optimum could be anywhere between pH 6 and pH 8 ✓ only one value between pH 6 and pH 8 tested ✓ idea that shape of data implies optimum less than pH 7 ✓ *Improvement* repeat at more pH values between 6 and 8 ✓	3	
	(d)		cofactor ✓	1	**IGNORE** coenzyme.
			Total	20	

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Question			Answer	Marks	Guidance
3	(a)		*two from* antibodies produced (by person being vaccinated) ✓ activation of (named) lymphocytes (of person being vaccinated) ✓ (specific) memory cells remain (in person being vaccinated) ✓	2	
	(b)	(i)	108.3 ✓	1	**IGNORE** all other responses.
		(ii)	28.0 ✓✓	2	**ALLOW** 1 mark if correct answer given to incorrect number of decimal places. *If answer is incorrect* **ALLOW** 1 mark for any number divided by the candidate's answer to part **(i)**. *If the candidates answer to part **(i)** is incorrect apply ecf.*
		(iii)	*max two from:* *idea that* lowest year has been cherry-picked ✓ *idea that* average of several years would have been a better indicator ✓ *idea that* level might fluctuate ✓ *plus:* use of processed data to support any of the above ✓	3	
	(c)		*two from* different pathogens have different <u>antigens</u> ✓ antigens have specific <u>shape</u> ✓ shape of antibody must be <u>complementary</u> to (specific) antigen ✓ *any of the above linked to* different antibody needed for each pathogen ✓	3	
			Total	11	

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Question			Answer	Marks	Guidance
4	(a)	(i)	2.8 (kPa) ✓	1	**ALLOW** answer in the range of 2.8–3.0 kPa
		(ii)	(llama) haemoglobin needs higher affinity for oxygen ✓ (so) can pick up oxygen at lower partial pressure (of oxygen) ✓	2	
	(b)*		**Level 3 (5–6 marks)** Describes differences and similarities of llama and camel haemoglobin at all four levels of protein structure with correct reference to bonding. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Describes differences and similarities of llama and camel haemoglobin in some levels of protein structure with some reference to bonding. *There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.* **Level 1 (1–2 marks)** Describes a difference or similarity of llama and camel haemoglobin at a level of protein structure. *The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.*	6	**Indicative scientific points include:** • difference in primary structure • different amino acid / polypeptide sequence • one amino acid changed. • amino acid change could cause change to secondary structure • initial coiling or folding of polypeptide chain • α-helix • β-pleated sheet • hydrogen bonding. • amino acid change could cause change to tertiary structure • further coiling of secondary structure • ionic bonding • disulphide bonds • hydrophilic/hydrophobic bonds • 3D shape.

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Question			Answer	Marks	Guidance
			0 marks No response or no response worthy of credit.		• amino acid change has not changed quaternary structure • alpha and beta subunits still able to form haemoglobin in both camel and llama.
	(c)		insoluble ✓ strong / AW ✓ unreactive / AW ✓	**3**	**IGNORE** flexible.
	(d)		*two from* add biuret / NaOH and $CuSO_4$, solution / reagent to urine ✓ observe colour change (from blue to purple) ✓ compare with, control / blank (urine containing no protein) ✓	**2**	**IGNORE** biuret test unqualified.
			Total	**14**	

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Question			Answer	Marks	Guidance
5	(a)	(i)	*three from* similar, niche / lifestyle / AW ✓ similar <u>selection pressure</u> ✓ *idea that* wings are advantage for survival in both bats and birds ✓ alleles for 'wings' more likely to be passed to next generation ✓	3	**ALLOW** 'same' **ALLOW** 'same' **ALLOW** 'genes'
		(ii)	*idea that* echolocation not needed for an animal active during the day where reduced visibility is not an issue ✓	1	
	(b)*		**Level 3 (5–6 marks)** Full and detailed evaluation of the claim using all of the data in Table 5.1. Learner demonstrates a holistic judgement of the data providing evidence for and against the claim. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Detailed evaluation of the claim using most of the data in Table 5.1. Sound judgement is made on a range of aspects of the data. *There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.* **Level 1 (1–2 marks)** An evaluation of the claim is attempted using some of the information in Table 5.1. Simple conclusions are drawn citing limited aspects of the data.	6	**Indicative scientific points may include:** **Support for conclusion (that common and soprano pipistrelle are distinct species)** • echolocation ranges do not overlap • genetic basis for echolocation suggests genetic difference between populations • idea that different species are likely to have genetic differences. **Information that could be used in support or to challenge** • Mean wing span is very similar • Could indicate difference, though not significant • Could be due to environmental factors, where the populations live. • Habitats overlap • Could indicate same species in different areas • Could be different species adapted to slightly different environments.

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Question			Answer	Marks	Guidance
			The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** No response or no response worthy of credit.		**Challenge to conclusion** • same mean body mass, could be same species • same colour, could be same species • potential environmental cause of body mass variation implies weak challenge to conclusion. **ALLOW** a comment on whether the researcher's conclusion is supported.
			Total	**10**	

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Question			Answer	Marks	Guidance
6	(a)		*three from* adenine / A pairs with thymine / T **and** cytosine / C pairs with guanine / G ✓ (because of) hydrogen bonding ✓ *idea that* purine can only bind with pyrimidine because they are different sizes ✓ *idea that* if one base is known it can pair with only one other base ✓	3	**ALLOW** 2 H bonds between A and T and 3 H bonds between C and G.
	(b)	(i)	(involves) DNA polymerase ✓ sugar-phosphate backbone (re)forms/condensation reaction between phosphate and sugar ✓ DNA winds into double helix ✓	3	**ALLOW** higher level answers e.g. role of DNA ligase in joining sugar-phosphate backbone lagging strand filled in with Okazaki fragments.
		(ii)	(new molecule consists of) one old strand and one new strand ✓	1	
			Total	7	

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