OCR

Oxford Cambridge and RSA

Practice paper - Set 1

A Level Biology A

H420/01 Biological processes

MARK SCHEME

Duration: 2 hours 15 minutes

MAXIMUM MARK 100

FINAL

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. For answers marked by levels of response:

Read through the whole answer from start to finish, concentrating on features that make it a stronger or weaker answer using the indicative scientific content as guidance. The indicative scientific content indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance.

Using a 'best-fit' approach based on the science content of the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, **best** describes the overall quality of the answer using the guidelines described in the level descriptors in the mark scheme.

Once the level is located, award the higher or lower mark.

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.

In summary:

- **The science content determines the level.**
- **The communication statement determines the mark within a level.**

Level of response questions on this paper are **17(b)** and **21(c)**.

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

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.

Question			Answer	Marks	Guidance
1			D ✓	1	
2			A ✓	1	
3			D ✓	1	
4			A ✓	1	
5			D ✓	1	
6			A ✓	1	
7			C ✓	1	
8			B ✓	1	
9			C ✓	1	
10			B ✓	1	
11			A ✓	1	
12			B ✓	1	
13			B ✓	1	
14			B ✓	1	
15			D ✓	1	
			Total	**15**	

Question			Answer	Marks	Guidance
16	(a)		**any 4 from:** no production of hCG , until 4 weeks / AW ✓ rapid increase / high gradient , until 8 weeks ✓ *idea that* rate of decline , is less than increase after 8 weeks ✓ levels peak at 8 weeks ✓ levels fluctuate / not constant, after 19 weeks ✓ *idea that* levels remain similar after 19 weeks ✓ use of comparative figures to illustrate any point **with units** ✓	4	All points with dates underlined must have exact wording to achieve mark **ALLOW** hCG production starts at 4 weeks / is undetectable until 4 weeks **ALLOW** 'fluctuation' / AW **DO NOT ALLOW** 'plateau'
	(b)		positive feedback ✓	1	
	(c)	(i)	(hCG is a) peptide hormone / hCG is not a lipid-based hormone ✓ (hCG) binds to cell surface receptor ✓ *idea that* cell signalling is involved in action of hCG ✓ (hCG) uses cAMP / second messenger , to bring about response in cell ✓	3	
		(ii)	DNA / deoxyribonucleic acid	1	**ALLOW** transcription(al) factor / repressor protein **DO NOT ALLOW** RNA / histone / DNA polymerase
	(d)		*idea that* (hydatidiform mole) cells produce more hCG than normal ✓ (due to) expression / up regulation , of genes ✓ synthesising more , hCG / protein(s) ✓ *idea that* other tissues could be stimulated to produce more hCG than normal ✓	3	Cannot be inferred from other mark points **ALLOW** stimulates , mitosis in / proliferation of , cells that secrete hCG **ALLOW** *idea that* hydatidiform mole inhibits / competes with another molecule that would otherwise regulate the production of hCG
			Total	12	

Question			Answer	Marks	Guidance
17	(a)	(i)	*synthesis of:* (named) carbohydrate ✓ hexose sugars ✓ amino acids ✓ lipids ✓	2	**ALLOW** regeneration of RuBP
		(ii)	GP / glycerate-3-phosphate ✓	1	
	(b) *		Read through the whole answer from start to finish, concentrating on features that make it a stronger or weaker answer using the indicative scientific content as guidance. The indicative scientific content indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the science content of the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer using the guidelines described in the level descriptors in the mark scheme. Once the level is located, award the higher or lower mark. **The higher mark** should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met. **The lower mark** should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing. **In summary:** • **The science content determines the level.** • **The communication statement determines the mark within a level.**	6	**Indicative scientific points may include…** • Coenzyme A: o transfers acetyl / acetate / 2C from link reaction to Krebs cycle • ADP/ATP: o phosphorylation of / addition of phosphate group to , glucose to form hexose-1,6-bisphosphate in glycolysis o dephosphorylation of / removal of phosphate group from , TP in glycolysis o dephosphorylation of / removal of phosphate group from , intermediate in Krebs cycle o formation from substrate level phosphorylation o formation from oxidative phosphorylation , harnessing chemical energy from chemiosmosis / proton motive force • NAD: o oxidation of / removal of H / removal of electrons from , triose (bis)phosphate in glycolysis o oxidation of / removal of H / removal of electrons from , pyruvate in link reaction

Question			Answer	Marks	Guidance
			Level 3 (5-6 marks) A full and detailed summary of the role of the different coenzymes in respiration, including their importance in processes that link together the component stages. *There is a well-developed line of reasoning which is clear and logically structured. The processes are detailed and clearly explained.* **Level 2 (3-4 marks)** A clear summary of the role of coenzymes in respiration is present, including some discussion of their involvement with various processes in the component stages. *There is a line of reasoning presented with some structure. The processes have some detail and are explained generally well.* **Level 1 (1-2 marks)** A limited summary of the role of some of the coenzymes in respiration is present, including some discussion of their involvement with process(es) in the component stages. *There is a logical structure to the answer. The explanation, though basic, is clear.* **0 marks** No response or no response worthy of credit		○ oxidation of / removal of H / removal of electrons from , intermediates in Krebs cycle ○ reduction of / addition of electrons to, electron transport chain / cytochrome in oxidative phosphorylation ○ reduction of / addition of electrons to , pyruvate in lactate fermentation ○ reduction of / addition of electrons to , ethanal in alcoholic fermentation • FAD: ○ oxidation of / removal of H / removal of electrons from , intermediates in Krebs cycle
			Total	**9**	

Question			Answer	Marks	Guidance
18	(a)	(i)	**A** phloem ✓ **C** xylem ✓	2	
		(ii)	meristem ✓	1	**ALLOW** meristematic **DO NOT ALLOW** stem cells / undifferentiated cells
	(b)	(i)	sharp blade (should be selected) ✓ so slide is thin enough , individual cells are visible / resolution is high ✓ method for slicing pieces of tissue (thinly) ✓ so slide is thin enough , individual cells are visible / resolution is high ✓ select thin(nest) slides ✓ to ensure maximum light can penetrate sample ✓ wet mount ✓ prevents dehydration / distortion of tissue ✓ squash slide ✓ easier to see individual cells / allows light to penetrate tissue more easily ✓	6	**ALLOW** any reasonable method (e.g. microtome) **ALLOW** quantified thickness (e.g. measured with a micrometer) **ALLOW** description **ALLOW** description
		(ii)	contrast is high(er) ✓ more (internal) structures visible ✓ some (named) organelles / cell components more visible , because they bind to stain ✓ clearer image can be obtained ✓	3	
	(c)		*extracellular because:* digestion is occurring in (liquid in) trap / leaf ✓ not inside cells ✓ (enzymes are) released by plant cells , into (liquid in) trap ✓ (enzymes may also come from) bacteria (in trap) ✓	3	

	(d)	**(i)**	pigment A contains 2 , components / molecules ✓ pigments B <u>and</u> D contain 1 , component / molecule ✓ pigment C contains 3 , components / molecules ✓ *idea that* pigments A and C share 2 , components / molecules ✓ *idea that* pigments A and D **OR** pigments B and C **OR** pigments C and D share 1 , component / molecule ✓ <u>all</u> pigments are soluble (in liquid phase) ✓	**3**	
		(ii)	0.35 ± 0.01 ✓✓	**2**	**ALLOW** 1 mark for evidence of 19 ÷ 55 1 mark maximum for incorrect s.f.
			Total	**20**	

Question			Answer	Marks	Guidance
19	**(a)**		matrix of mitochondrion ✓	**1**	**ALLOW** mitochondria
	(b)	**(i)**	**K** acetyl group (of CoA) ✓ **L** citrate ✓ **M** carbon dioxide / CO_2 ✓ **N** oxaloacetate ✓	**4**	**ALLOW** acetate
		(ii)	**Q** <u>substrate level phosphorylation</u> ✓	**1**	
	(c)	**(i)**	axis labelled 'concentration of malate (mmol dm^{-3})' **AND** *y* axis labelled 'rate of reaction of malate dehydrogenase (mmol dm^{-3} s^{-1})' ✓ plotted points use ≥50% of area provided **AND** equidistant scales on *x* and *y* axes ✓ points plotted correctly ± 1 mm ✓ **smooth** line of best fit ✓	**4**	**ALLOW** landscape **OR** portrait graph **DO NOT ALLOW** any other units, e.g. mM dm^{-3} / mM/dm^3 / mmol/dm^3 (since units are provided on table) **ALLOW** 'conc.' **DO NOT ALLOW** inversion of axes **ALLOW** solidus instead of brackets **NOTE** *x* axis data are non-linear **DO NOT ALLOW** points joined by straight lines (since candidates should recognise shape of curve)

Question			Answer	Marks	Guidance
		(ii)	6.1 ✓✓ mmol dm^{-3} s^{-1} ✓	3	1 mark for evidence of: (92.3 - 37.7) ÷ 9 2 max if answer is not to 2 SF **ALLOW** mmol dm^{-3} /s
		(iii)	not an enzyme inhibitor / does not inhibit malate dehydrogenase ✓ *idea that* similar curve would be expected in absence of inhibitor / in normal conditions ✓ allows enzyme / malate dehydrogenase to work at optimal rate / V_{max} ✓ *idea that* may inhibit a different enzyme ✓	3	
	(d)		(ventricular) tachycardia ✓	1	
			Total	17	

Question			Answer	Marks	Guidance
20	(a)	(i)	hydrophyte ✓	1	
		(ii)	**X** symplast ✓ **Y** apoplast ✓	2	
	(b)	(i)	temperature ✓ humidity (of air) ✓ air currents ✓ light intensity ✓ *idea of* health of leaves ✓	2	**DO NOT ALLOW** species of leaves **DO NOT ALLOW** surface area **IGNORE** age of leaf (as this is correlated with surface area) **IGNORE** air bubbles in potometer, etc. **DO NOT ALLOW** 'warmth' or 'heat' **ALLOW** water (vapour) potential **DO NOT ALLOW** 'moisture' or 'water levels' alone **ALLOW** wind **ALLOW** 'leaves should not be damaged'

Question			Answer	Marks	Guidance
		(ii)	*high rate of transpiration does not matter because:* (plant lives in an) aquatic / AW habitat , so water lost is easily / AW , replaced ✓	1	**IGNORE** references to hydrophyte adaptations
	(c)		air spaces in leaves/ stems allows leaves / stems to float , so they can access light , for photosynthesis ✓ stomata on upper leaf surface to allow access to air , absorption of CO_2 ✓ stem has air spaces oxygen can diffuse to roots , for aerobic respiration ✓ roots may be reduced / absent not required to obtain water ✓ **OR** *idea of* not wasting resources ✓ waxy surface / cuticle so water does not block stomata ✓ reduced vascular tissues high water availability ✓ **OR** *idea of* not wasting resources ✓	3	**ALLOW** aerenchyma
			Total	9	

Question			Answer	Marks	Guidance
21	(a)	(i)	A ✓ B ✓	2	
		(ii)	five cells drawn adjacent to each other **AND** clear continuous lines ✓ correct proportions ✓ uses ≥50% of area provided ✓ *annotations:* label lines drawn with a ruler to correct feature ✓ cell membrane **AND** nucleus **AND** cytoplasm labelled ✓ comparative colour of any of above mentioned ✓	5	**DO NOT ALLOW** cells separated by gaps **DO NOT ALLOW** more than five cells **DO NOT ALLOW** ragged lines / any shading **ALLOW** if it is clear which cells the candidate has attempted to draw **IGNORE** any annotations not mentioned here **DO NOT ALLOW** arrow heads **ALLOW** implied comparison from different colours **NOTE:**  = 3 marks (MP2, 3 and 6)

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td>(b)</td><td></td><td>One mark per correct row
<table><tr><th>Region of adrenal gland</th><th>Hormone produced</th><th>Role of hormone in body</th></tr><tr><td>cortex</td><td></td><td>Na^+ / K^+ / ion , reabsorption in kidneys / concentration in blood OR water reabsorption OR control of blood pressure</td></tr><tr><td></td><td>adrenaline</td><td></td></tr></table>✓ ✓</td><td>2</td><td>ALLOW epinephrine / noradrenaline / norepinephrine</td></tr>
<tr><td></td><td>(c)
*</td><td></td><td>Read through the whole answer from start to finish, concentrating on features that make it a stronger or weaker answer using the indicative scientific content as guidance. The indicative scientific content indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance.

Using a 'best-fit' approach based on the science content of the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer using the guidelines described in the level descriptors in the mark scheme.

Once the level is located, award the higher, middle or lower mark.

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.</td><td>9</td><td>Indicative scientific points may include…
• Independent variable – concentration of GH injected
• Dependent variable – rate of growth
• Control variables – animal species , foodstuff , (named) conditions
• Trial populations over several months
• Control group to ensure validity of conclusions
• Method for assessing growth – e.g. % mass change or growth <u>rate</u> to allow comparability
• Different species of chickens should be investigated
• Ensure food is consistent across all trial groups
• Sample size needs to be large enough to reduce effect of anomalies
• Ethical concerns – chickens should be reared in humane conditions</td></tr>
</table>

Question			Answer	Marks	Guidance
			The middle mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing. **The lower mark** should be awarded where the level descriptor has been evidenced but the communication statement (in italics) has not been met. **In summary:** • **The science content determines the level.** • **The communication statement determines the mark within a level.** **Level 3 (7–9 marks)** A full and detailed method is provided which would allow valid comparisons and data to be collected. There is a detailed explanation of the variables to be changed and measured, and how this could realistically be attempted in the scenario provided, along with detailed information about which variables need to be controlled. There is an appreciation of ethical concerns involved OR an appreciation of the sample size required to obtain repeatable data and to rule out anomalies. *There is a well-developed line of reasoning which is clear and logically structured. The method is detailed and clearly argued.* **Level 2 (4-6 marks)** A detailed method is provided which would allow valid comparisons and data to be collected. There is an explanation of the variables to be changed and measured, and how this could be attempted in the scenario provided, along with information about which variables need to be controlled. There is mention of the sample size required to		• Consideration of potential negative effects on chickens, e.g. larger muscle mass, so may be unable to move as easily

Question			Answer	Marks	Guidance
			obtain representative data. *There is a line of reasoning presented with some structure. The method has some detail.* **Level 1 (1-3 marks)** A limited method is provided which may allow valid comparisons and data to be collected. There is some explanation of the variables to be changed and measured, and how this could be attempted, along with limited information about which variables need to be controlled. Possible consideration of the sample size required for representative data is included. *There is a logical structure to the answer. The explanation, though basic, is clear.* **0 marks** No response or no response worthy of credit		
			Total	**18**	