

**OCR**

Oxford Cambridge and RSA

**Practice paper - Set 1**

**A Level Biology A**

**H420/03** Unified biology

**MARK SCHEME**

**Duration:** 1 hour 30 minutes

**MAXIMUM MARK    70**

**FINAL**

**This document consists of 12 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. 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 **1(c)** and **3(a)**.

## 11. Annotations

<b>Annotation</b>	<b>Meaning</b>
<b>DO NOT ALLOW</b>	Answers which are not worthy of credit
<b>IGNORE</b>	Statements which are irrelevant
<b>ALLOW</b>	Answers that can be accepted
( )	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
<b>ECF</b>	Error carried forward
<b>AW</b>	Alternative wording
<b>ORA</b>	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	a	no sexual reproduction ✓ no / little , genetic variation ✓ <i>idea of susceptible to new diseases ✓</i> <i>idea of susceptible to changing environment ✓</i>				3	<b>ALLOW</b> <i>idea of limited gene pool</i>												
	b	<table border="1"> <thead> <tr> <th>Feature</th> <th>Cause of feature</th> <th>Number of genes involved</th> <th>Type of graph used to present data</th> </tr> </thead> <tbody> <tr> <td>Circumference (mm)</td> <td>environment <b>and</b> genes / genetics</td> <td>many / several / polygenic / AW</td> <td>line graph</td> </tr> <tr> <td>Containing seeds or seedless</td> <td>genes / genetics</td> <td>one / two</td> <td>bar , chart / graph</td> </tr> </tbody> </table> <p style="text-align: center;"> <span style="margin-right: 100px;">✓</span> <span style="margin-right: 100px;">✓</span> <span>✓</span> </p>				Feature	Cause of feature	Number of genes involved	Type of graph used to present data	Circumference (mm)	environment <b>and</b> genes / genetics	many / several / polygenic / AW	line graph	Containing seeds or seedless	genes / genetics	one / two	bar , chart / graph	3	<b>One mark per correct column</b>  <b>ALLOW</b> histogram instead of line graph
Feature	Cause of feature	Number of genes involved	Type of graph used to present data																
Circumference (mm)	environment <b>and</b> genes / genetics	many / several / polygenic / AW	line graph																
Containing seeds or seedless	genes / genetics	one / two	bar , chart / graph																
	c	<p><b>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</b></p> <p><b>In summary:</b>  <i>Read through the whole answer. (Be prepared to recognise and credit unexpected approaches where they show relevance.)</i>  <i>Using a ‘best-fit’ approach based on the science content of the answer, first decide which of the level descriptors, <b>Level 1</b>, <b>Level 2</b> or <b>Level 3</b>, best describes the overall quality of the answer.</i>  <i>Then, award the higher or lower mark within the level, according to the <b>Communication Statement</b> (shown in italics):</i></p> <ul style="list-style-type: none"> <li>○ <i>award the higher mark where the Communication Statement has been met.</i></li> <li>○ <i>award the lower mark where aspects of the Communication Statement have been missed.</i></li> </ul> <p> <b>• The science content determines the level.</b>  <b>• The Communication Statement determines the mark within a level.</b> </p>																	
		<p><b>Level 3 (5-6 marks)</b>            Includes detailed explanations for most of the observations, with clear links to the correct hormone treatment and including relevant biochemical details where appropriate.</p> <p><i>There is a well-developed line of reasoning, which is clear and logically-structured and uses scientific terminology at an appropriate level. All the information presented is relevant and forms a continuous narrative.</i></p>				6	<b>Indicative scientific points may include:</b> <i>shorter roots</i> high auxin concentrations / auxin in addition to the natural production inhibits root growth  <i>taller</i> gibberellins promote stem elongation												

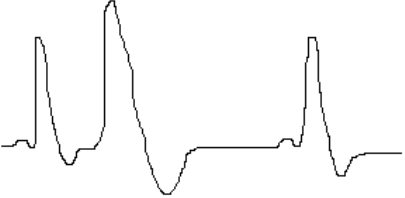
Question		Answer	Marks	Guidance					
		<p><b>Level 2 (3-4 marks)</b> Includes explanations for some of the observations, with some links to the correct hormone treatment and/or including relevant biochemical details.</p> <p><i>There is a line of reasoning presented with some structure and use of appropriate scientific language. The information presented is mostly relevant.</i></p> <p><b>Level 1 (1-2 marks)</b> A limited number of observations included in the response, without clear links to the correct hormone treatment and/or including only limited biochemical detail.</p> <p><i>There is a logical structure to the answer. The explanation and use of scientific language, though basic, is clear.</i></p> <p><b>0 marks</b> No response or no response worthy of credit.</p>		<p>by stimulating cell elongation and division</p> <p><i>growth timing</i> gibberellins promote seed germination by activating genes for amylase and protease enzymes, which break down food stores.</p> <p><i>side branches</i> auxin maintains apical dominance and inhibits the growth of lateral shoots/branches.</p> <p><i>delayed fruit and leaf fall</i> (a small addition of) auxin slows down fruit drop and leaf fall. Auxin inhibits abscission by preventing ethene production from increasing.</p>					
2	a	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td style="text-align: center;">NO</td></tr> <tr><td style="text-align: center;">YES</td></tr> <tr><td style="text-align: center;">NO</td></tr> <tr><td style="text-align: center;">NO</td></tr> <tr><td style="text-align: center;">YES</td></tr> </table> <p>✓✓</p>	NO	YES	NO	NO	YES	2	<p>ALL CORRECT = 2 marks 3 CORRECT = 1 mark</p> <p><b>ALLOW</b> correct placement of ticks and crosses in the boxes, if clear and unambiguous</p>
NO									
YES									
NO									
NO									
YES									
	b	i	A = Glomerulus ✓ B = Bowman's capsule ✓	2	<b>ALLOW</b> capillary (network)				
		ii	190 ✓✓	2	<b>AWARD ONE MARK</b> for: 0.03 or 3 / 160				
	c	i	initial / AW , glucose concentration (on both sides on the membrane) ✓ volume of solution ✓ length / diameter , of dialysis tubing ✓ type / brand , of dialysis tubing ✓	2					



Question		Answer	Marks	Guidance
	ii	<i>alpha glucose</i> H above ring / OH below ring , on , carbon 1 / C1 <b>ORA</b> ✓	1	<b>ALLOW</b> a suitable annotated diagram
	iii	( <i>less reabsorption because</i> ) <i>idea of fewer H<sup>+</sup> ions in PCT cells</i> ✓ less / no , co-transport / facilitated diffusion , of Na <sup>+</sup> ions , into cells / from lumen ✓ less / no , active transport of Na <sup>+</sup> ions into , blood ✓	3	
	d	Conclusion: No because month 3 is above 60 cm <sup>3</sup> min <sup>-1</sup> ✓  Month 2: 48.5 cm <sup>3</sup> min <sup>-1</sup> Month 3: 67.2 cm <sup>3</sup> min <sup>-1</sup> Month 4: 58.2 cm <sup>3</sup> min <sup>-1</sup> ✓	2	The second mark is for 3 correct calculations
3	a	<p><b>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</b></p> <p><b><i>In summary:</i></b>  <i>Read through the whole answer. (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 of the level descriptors, <b>Level 1, Level 2</b> or <b>Level 3</b>, best describes the overall quality of the answer.  Then, award the higher or lower mark within the level, according to the <b>Communication Statement</b> (shown in italics):</i></p> <ul style="list-style-type: none"> <li>○ <i>award the higher mark where the Communication Statement has been met.</i></li> <li>○ <i>award the lower mark where aspects of the Communication Statement have been missed.</i></li> </ul> <p>• <b>The science content determines the level.</b>  • <b>The Communication Statement determines the mark within a level.</b></p>		
		<p><b>Level 3 (5-6 marks)</b>  A comparison of all or most aspects of the two processes is included, with no significant errors.</p> <p><i>There is a well-developed line of reasoning, which is clear and logically-structured and uses scientific terminology at an appropriate level. All the information presented is relevant and forms a continuous narrative.</i></p> <p><b>Level 2 (3-4 marks)</b>  A description of some similarities and differences between the two processes is included, with only minor errors.</p>	6	<p><b>Indicative scientific points may include:</b></p> <p><i>Similarities</i></p> <ul style="list-style-type: none"> <li>• DNA unwinds and unzips</li> <li>• Helicase enzymes</li> <li>• Template DNA</li> <li>• Complementary base pairing</li> <li>• Hydrogen bonds</li> <li>• Free, activated nucleotides</li> <li>• Polymerase enzymes</li> </ul>

Question		Answer	Marks	Guidance	
		<p><i>There is a line of reasoning presented with some structure and use of appropriate scientific language. The information presented is mostly relevant.</i></p> <p><b>Level 1 (1-2 marks)</b> A description of similarities or differences between the two processes is included, but with significant omissions or errors.</p> <p><i>There is a logical structure to the answer. The explanation and use of scientific language, though basic, is clear.</i></p> <p><b>0 marks</b> No response or no response worthy of credit.</p>		<p><i>Differences</i></p> <ul style="list-style-type: none"> <li>• Only a small section of DNA (where the gene is located) unzips during transcription</li> <li>• Both strands act as templates in replication</li> <li>• RNA vs DNA free nucleotides</li> <li>• RNA vs DNA polymerase</li> <li>• Different helicase enzymes</li> <li>• Products are two new daughter strands of DNA in replication and one mRNA strand in transcription</li> <li>• mRNA leaves nucleus whereas the new DNA strand remains bound to the template strand</li> </ul>	
	<b>b</b>	<b>i</b>	radioactive , labels / tags ✓ fluorescent , labels / tags ✓ UV , light / radiation ✓ (named) visible stain ✓	<b>2</b>	
		<b>ii</b>	X placed on any fragment below Y ✓	<b>1</b>	X can be placed in any of the 9 lanes, but must be touching a DNA band that is lower in the image (nearer the cathode) than Y
	<b>c</b>	<b>i</b>	denature / unfold , protein <b>AND</b> idea of exposes charges or hydrophobic region ✓	<b>1</b>	
		<b>ii</b>	<i>idea that</i> different proteins have different overall charges ✓ <i>idea that</i> (binding of) SDS makes all proteins negatively charged ✓ <i>idea that</i> proteins will be separated by , mass / length ✓ <i>idea that</i> proteins move in the same direction ✓	<b>2</b>	

Question			Answer	Marks	Guidance						
4	a	i	no / less , planting <b>AND</b> <i>idea of</i> trees remove water from the bog ✓ no ditch <b>AND</b> <i>idea of</i> ditch drains water from the bog ✓ no / controlled , grazing <b>AND</b> <i>idea of</i> overgrazing disrupts the food chain ✓ no / less , burning <b>AND</b> <i>idea of</i> death of organisms from rare species ✓	3							
	a	ii	<i>idea that</i> preservation leaves ecosystems untouched, or without human interference ✓ <i>idea that</i> most peat bogs have been damaged already and require management and restoration ✓	2							
	b	i	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">0.0964</td> <td style="text-align: center;">0.0093</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>	8	0.0964	0.0093	✓	✓	✓	3	
8	0.0964	0.0093									
✓	✓	✓									
		ii	A has greater richness ✓ <b>ORA</b> B has greater evenness ✓ <b>ORA</b>	2							
		iii	stratified <b>AND</b> random (within each area) ✓  <i>idea that</i> the number of samples within each area should be proportional to their size ✓ correct suggestion for the number of samples taken within each area ✓	3	<b>ALLOW</b> description of stratified  e.g. 8 in conifer area, 24 in marshy area, 32 in grazed area						
	c		A because mean proportion of heterozygotes is higher ✓ A = 0.898 <b>AND</b> B = 0.854 ✓	2	<b>ALLOW</b> any correct number of significant figures and percentages						
5	a	i	(in X) <i>idea of</i> no defined P phase ✓  atrial fibrillation ✓  <i>idea of</i> rapid or frequent electrical impulses in atria ✓  <i>idea of</i> electrical impulses not only from SAN ✓  <i>idea of</i> smaller gaps between QRS phases ✓ <b>ORA</b> <i>idea of</i> heart rate set by SAN is faster ✓ <b>ORA</b>	4	<b>IGNORE</b> references to T waves  <b>ALLOW</b> Y has a defined P phase  <b>ALLOW</b> Y does not show atrial fibrillation <b>ALLOW</b> <i>idea of</i> regular bursts of electrical impulses through atria in Y  <b>ALLOW</b> electrical impulses only from SAN in Y						

Question		Answer	Marks	Guidance
	ii	4570 ✓✓ cm <sup>3</sup> min <sup>-1</sup> ✓	3	Apply ECF <b>ALLOW</b> 4571 to 4572 <b>ALLOW 1 mark for</b> heart rate of 57.14 (allow 57.0 to 57.2) bpm (4 full cycles in 4.2 seconds) <b>if no other mark awarded</b>
	b	three cardiac cycles drawn ✓ second cardiac cycle closer to the first cycle than the third cycle ✓ abnormal QRS in second cycle (e.g. extended peak or lack of T phase) ✓	2	e.g. 2 marks for 
	c	(binds to) receptor in , cell surface / plasma , membrane ✓ glycoprotein ✓	2	
6	a	<i>idea that</i> minimum period of darkness required for flowering is between 6.5 and 8.5 hours ✓ <i>idea that</i> cockleburs flower when day length/period of exposure to light decreases ✓ <i>idea that</i> red light prevents flowering ✓ <i>idea that</i> far red light reverses/resets the effect of red light ✓ <i>idea that</i> far red light reduces the period of darkness required for flowering ✓	3	<b>ALLOW</b> red light has no effect on flowering
	b	ethene ✓	1	
	c	(named) chemicals ✓ folding ✓ stings ✓	2	<b>ALLOW</b> 2 named chemicals
			<b>Total</b>	<b>70</b>