



2007 Biology

Intermediate 2

Finalised Marking Instructions

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GENERAL MARKING ADVICE: BIOLOGY

The marking schemes are written to assist in determining the 'minimal acceptable answer' rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates' evidence, and apply to marking both end of unit assessment and course assessments.

1. There are no **half marks**. Where three answers are needed for two marks, normally one or two correct answers gain one mark.
2. In the mark scheme, if a word is **underlined** then it is essential; if a word is **(bracketed)** then it is not essential.
3. In the mark scheme, words separated by / are **alternatives**.
4. If two answers are given which contradict one another the first answer should be taken. However, there are occasions where the second answer negates the first and no marks are given. There is no hard and fast rule here, and professional judgement must be applied. Good marking schemes should cover these eventualities.
5. Where questions in data are in two parts, if the second part of the question is correct in relation to an incorrect answer given in the first part, then the mark can often be given. The general rule is that candidates should not be penalised repeatedly.
6. If a numerical answer is required and units are not given in the stem of the question or in the answer space, candidates must supply the units to gain the mark. If units are required on more than one occasion, candidates should not be penalised repeatedly.
7. Clear indication of understanding is what is required, so:
 - if a description or explanation is asked for, a one word answer is not acceptable
 - if the question ask for **letters** and the candidates gives words and they are correct, then give the mark
 - if the question asks for a word to be **underlined** and the candidate circles the word, then give the mark
 - if the result of a calculation is in the space provided and not entered into a table and is clearly the answer, then give the mark
 - **chemical formulae** are acceptable eg CO₂, H₂O
 - contractions used in the Arrangements document eg DNA, ATP are acceptable
 - words not required in the syllabus can still be given credit if used appropriately eg metaphase of meiosis.
8. Incorrect **spelling** is given. Sound out the word(s),
 - if the correct item is recognisable then give the mark
 - if the word can easily be confused with another biological word then **do not** give the mark eg ureter and urethra
 - if the word is a mixture of other biological words then **do not** give the mark, eg melluym, melebrum, amniosynthesis.

9. **Presentation of data:**

- if a candidate provides two graphs or bar charts (eg one in the question and another at the end of the booklet), mark both and give the higher score
- if the question asks for a line graph and a histogram or bar chart is given, then do not give the mark(s). Credit can be given for labelling the axes correctly, plotting the points, joining the points either with straight lines or curves (best fit rarely used)
- if the x and y data are transposed, then do not give the mark
- if the graph used less than 50% of the axes, then do not give the mark
- if 0 is plotted when no data is given, then do not give the mark (ie candidates should only plot the data given)
- no distinction is made between bar charts and histograms for marking purposes. (For information: bar charts should be used to show discontinuous features, have descriptions on the x axis and have separate columns; histograms should be used to show continuous features; have ranges of numbers on the x axis and have contiguous columns)
- where data is read off a graph it is often good practice to allow for acceptable minor error. An answer may be given 7.3 ± 0.1 .

10. **Extended response questions:** if candidates give two answers where this is a choice, mark both and give the higher score.

11. **Annotating scripts:**

- put 0 in the box if no marks awarded – a mark is required in each box
- indicate on the scripts why marks were given for part of a question worth 3 or 2 marks. A ✓ or X near the answers will do.

12. **Totalling scripts:** errors in totalling can be more significant than errors in marking:

- enter a correct and carefully checked total for each candidate
- do not use running totals as these have repeatedly been shown to lead to more errors.

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Marking scheme

Section A

1.	C	11.	A	21.	D
2.	D	12.	B	22.	B
3.	A	13.	D	23.	C
4.	C	14.	B	24.	C
5.	B	15.	B	25.	B
6.	C	16.	D		
7.	D	17.	C		
8.	B	18.	A		
9.	D	19.	D		
10.	A	20.	A		

Marking Instructions

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Section B

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p>1 (a)</p> <p>(b)</p> <p>(c) (i)</p> <p>(ii)</p> <p>(d) (i)</p> <p>(ii)</p>	<p>trachea</p> <p>artery left</p> <p>thin/one cell thick/(semi) permeable <u>lining/wall</u></p> <p>moist</p> <p>large <u>surface</u> area</p> <p>good/efficient blood supply/flow or network/many/dense blood vessels/blood capillaries or in close contact with blood supply/capillaries</p> <p>glucose</p> <p>carbon dioxide/water/lactic acid</p> <p>water</p> <p>Turgid/hypertonic/turgor</p>	<p>1</p> <p>both for 1 mark</p> <p>any 2 1 mark each</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>very thin/one cell thick/cell wall is thin/thin membrane</p> <p>mucus</p> <p>Sugar/food</p>	<p>Any additional answer</p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates				
<p>2 (a) (i)</p> <p>(ii)</p> <p>(b)</p>	<p>To make sure no other factor is producing the result or to show it is the <u>germinating/live</u> peas that are producing the result or to show it is the <u>germinating/live</u> peas that are using oxygen or to show that <u>live</u> peas respire or to show that <u>dead</u> peas/<u>boiled</u> peas do not respire or to increase validity or for a valid conclusion</p> <p>It/The liquid will rise further/faster/more quickly/higher</p> <p>answer must be comparative</p> <table border="1" data-bbox="443 946 958 1153"> <tr> <td data-bbox="443 946 694 1050"><i>Aerobic respiration in germinating peas</i></td> <td data-bbox="694 946 958 1050"><i>Anaerobic respiration in germinating peas</i></td> </tr> <tr> <td data-bbox="443 1050 694 1153">X Y</td> <td data-bbox="694 1050 958 1153">W X Z</td> </tr> </table>	<i>Aerobic respiration in germinating peas</i>	<i>Anaerobic respiration in germinating peas</i>	X Y	W X Z	<p>1</p> <p>1</p> <p>1 mark for each correct column</p>	<p>for comparison/reliability/accuracy/fairness or to prove that it was the peas producing the liquid or answers linked to germination not respiration or CO₂ based answers</p> <p>It would increase/rise or It will have a bigger volume</p>	<p>Any extra/missing letters</p>
<i>Aerobic respiration in germinating peas</i>	<i>Anaerobic respiration in germinating peas</i>							
X Y	W X Z							

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates	
3	(a) (i)	green/yellow/orange/red/brown	1		Any additional incorrect colour
	(ii)	Protein/(poly) peptides	1		
	(b)	Box 1 – amino acids	1	Peptides/chains of amino acids	Any extra substance
		Box 2 – carbon, hydrogen, oxygen/CHO	1		Any extra element
	(c)	(i)	pepsin/rennin	1	Rennet/protease
		(ii)	accept 1.4 to 1.6 Accept 1 ½	1	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
4 (a) (i)	5.5 accept answer in space	1		
(ii)	concentration/percentage of hydrogen peroxide or pH (of hydrogen peroxide) or mass/weight/surface area/size/volume of tissue/cube/food or temperature mark first two answers only	any 2 1 mark each	time volume of hydrogen peroxide type of tissue amount/measures/quantity size of test tube/measuring cylinder length of tube volume/pH of water volume of oxygen size/volume etc of potato or any named tissue	
(iii)	repeated (and average calculated)	1	averaged	
(iv)	different tissues have different <u>catalase</u> concentrations or liver has the most <u>catalase</u> or apple has the least <u>catalase</u> must be comparative	any 1	liver produces most oxygen or apple produces least oxygen or all tissues contain catalase	volumes of oxygen used incorrectly (e.g. liver has highest catalase of 38.5)

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
4 (b) (i)	synthesis	1		
(ii)	increases/speeds it up/faster must be comparative	1	fast/high	
(iii)	lipase/it does not act on/not specific to glucose-1-phosphate/glucose/this substrate or lipase/active site does not fit/join with glucose-1-phosphate/glucose/this substrate or lipase/it is specific to fats/another substrate or only phosphorylase will act on/is specific to glucose-1-phosphate/glucose or an enzyme is specific to its <u>substrate/reaction</u> or only phosphorylase produces starch	1	glucose-1-phosphate is specific to phosphorylase or lipase is not specific to starch or it is not the correct enzyme or any reference to degradation of starch	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
5 (a)	Stores/holds <u>urine</u> renal artery D	3 for 2 marks 1/2 for 1 mark	Stores/holds urea/waste or collects urine or passes/releases/excretes urine	Any additional incorrect entry (eg store and cleans urine)
(b) (i)	ADH/anti diuretic (hormone)	1	diuretic (hormone)	All 3 ticked
(ii)	decreases/reduces/less	1		
(iii)	glucose and salts (both must be ticked)	1		
(iv)	60	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p>6 (a)</p> <p>(b)</p> <p>(c)</p>	<p>P sensory Q motor</p> <p>(eyelid) <u>muscles</u></p> <p>for protection or</p> <p>rapid/fast/quick</p> <p>must relate to function</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>sensor motory</p> <p>Eyelid/nerve ending in eyelid</p> <p>alert.../ anything which indicates a conscious response (eg avoid danger) involuntary/ specific example (eg blinking)</p>	<p>strip</p> <p>Any additional structure/letter</p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates				
7	(a) (i) oxygen	1						
	(ii) A See General Marking Advice No 9 <u>Scale</u> Correct scale and label with units for X-axis <u>Plot</u> Correct plot and line joining all 6 points or Correct plot using their scale and line joining all 6 points If bar graph drawn – no plot mark, but check scale	1 1	Graph uses less than 50% of grid If line does not go through each point or Extrapolation of line at either end					
	B Another factor is limiting (photosynthesis) or Another named factor is limiting or It has reached the optimum/maximum rate <u>for these conditions</u> or Light is no longer a limiting factor	1	It has reached the optimum/maximum rate Rate of photosynthesis stayed the same					
	(b) (i) Substance 1 ATP Substance 2 hydrogen/NADPH ₂ (or vice versa)	1 1	atp	2/36/38 or Pi				
	(ii) carbon fixation/Calvin cycle/dark (reaction)/light independent	1						
	(c)	<table border="1" data-bbox="544 1241 938 1348"> <tr> <td><i>Name of carbohydrate</i></td> </tr> <tr> <td>starch</td> </tr> <tr> <td>cellulose</td> </tr> </table>	<i>Name of carbohydrate</i>	starch	cellulose	1 1		
	<i>Name of carbohydrate</i>							
starch								
cellulose								

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
8 (a) (i) (ii) A B (b) (i) (ii) (iii)	nucleus	1	nucleolus	
	DNA/deoxyribonucleic acid	1	dna	
	It/DNA determines the sequence of <u>amino acids in enzyme/protein</u> or	Any 2 1 mark each	codes for protein or contains genetic information	
	It/DNA determines the <u>structure/function/type of enzyme/protein</u> or			
	<u>Enzymes/proteins</u> control cell activities			
	Meiosis	1	any spelling which includes a t	
	Random/independent assortment (accept chiasmata <u>formation</u> /crossing over)	1	shuffling random selection randomisation	
Half	1			
Fusion twice (both needed)	1			

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
9 (a) (i) (ii) (b)	(Cross) 1 /F ₁ / <u>all</u> rose comb fowl	1		
	Genotype of gametes r r (both must be clearly given)	1		
	Genotypes of offspring Rr Rr rr rr (or correct results from given wrong gametes)	1		
	True False Correction ✓ ✓ polygenic ✓ ✓	1 1 1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p>10 (a)</p>	<p>Jan to Apr – decreases/goes down Apr to Aug – increases/goes up Aug to Dec – decreases/goes down</p> <p>At least one figure + unit used at least once (1000/m²) Jan = 6, Apr = 2, Aug = 18, Dec = 6</p>	<p>1</p>	<p>only giving pattern, no named months or starting from April or August</p>	
<p>(b)</p>	<p>6</p>	<p>1</p>		
<p>(c)</p>	<p>No/fewer predators/birds from <u>April to August</u> or They have reproduced from <u>April to August</u> or Birds not present (in large numbers) <u>April to August</u></p>	<p>1</p>	<p>Any reference to temperature</p>	
<p>(d)</p>	<p>Prediction increases/decreases// stays the same Answer to indicate species numbers</p> <p>Explanation must match prediction eg Explanation for decreases: Corophium will become extinct or reduced number of Corophium leads to reduced number of predator <u>species</u> eg Explanation for stays the same: No <u>species</u> become extinct (only population falls) eg Explanation for increases: Less Corophium means less competition, therefore more species move in</p>	<p>1</p>	<p>Answer based on Corophium</p>	

Section C

Question 1A

- (a) A1 red blood cells and plasma **1 mark**
- (b) A2 oxygen transported in red blood cells **maximum**
A3 attached to haemoglobin/as oxyhaemoglobin **4 marks**
A4 carbon dioxide transported in red blood cells/attached to haemoglobin
A5 carbon dioxide carried in/dissolved in plasma
A6 carried as bicarbonate ions
A7 soluble foods dissolved in plasma
A8 named example of soluble food carried
A9 other correct substance carried by plasma
eg water/hormones/vitamins/minerals/salts/fats/proteins

TOTAL 5 MARKS

Question 1B

- (a) B1 hypothalamus **1 mark**
- (b) B2 sweating is reduced/stops **maximum**
B3 blood vessels constrict/narrow/vasoconstriction **4 marks**
B4 reduces blood flow (to skin)
B5 to reduce heat loss (award only if B2,B3 or B4 correct)
B6 hair stands on end/hair (erector) muscles contract
B7 to trap air/heat/insulate (award only if B6 correct)
B8 rapid/quick/repeated muscle contraction/shivering
B9 to generate heat/increase(body)temperature/heat up
(award only if B8 correct)

TOTAL 5 MARKS

Labelled diagrams acceptable if the labels match marking points

Question 2A

- A1 (Insulin) gene identified/located **Any 5**
- A2 (Insulin) gene removed from human chromosome
- A3 Plasmid removed from bacterium
- A4 Plasmid cut open
- A5 Enzyme(s) used (award mark only once)
- A6 (Insulin) gene inserted into plasmid
- A7 Plasmid inserted into bacterium
- A8 Bacteria multiply/cultured
- A9 Bacteria produce insulin
- A10 Insulin extracted/purified for use

TOTAL 5 MARKS

Question 2B

- B1 Two forms found (any reasonable description) **Any 5**
- B2 Dark form occurs naturally/by mutation
- B3 In rural/non-polluted/pre-industrial areas trees covered in lichen/light coloured
- B4 In industrial/polluted areas trees covered in soot/dark coloured
- B5 Example of which form is most/least common linked to its environment
- B6 Camouflage (any correct example) (not active eg moths camouflage themselves)
- B7 Seen/eaten by predators/birds (any correct example)
- B8 Chances of survival (any correct example)
- B9 Chances of breeding (any correct example)
- B10 Chances of passing on their characteristics/genes to the next generation
- B11 Description of population change (any correct example)

TOTAL 5 MARKS

[END OF MARKING INSTRUCTIONS]