



**2010 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 CO<sub>2</sub>, H<sub>2</sub>O
  - 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  $7.3 \pm 0.1$ .

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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**Section A**

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

Marking Instructions

Biology Intermediate 2 2010

Section B

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates		
1	(a) (i)	Controls/allows/lets entry <u>and</u> exit of materials Contains <u>genetic</u> information/DNA/genes/ chromosomes <b>OR</b> controls cell activities (specific activity must be correct) Cytoplasm <b>3 = 2 marks</b> <b>2/1 = 1 mark</b>	2	Protects/holds cell together/entry only/exit only	Brain of cell  Controls all cell activities	
		(ii)				Q <u>and</u> contains cell wall/vacuole  <b>Both</b>
	(b)	(i)	bacteria	1		
			lactose	1		
		(ii)	Alcohol petrol <b>Both needed</b>	1		
	(iii)	To kill/destroy <u>bacteria</u> /prevent <u>bacterial</u> growth	1	Get rid of disease Attack disease Fight bacteria Stop bacteria Bacteria spreading		antibodies

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
2	<p>(a) (i) Oxygen</p> <p>(ii) Water</p> <p>(iii) Boiled liver/boiled catalase/any inert material</p> <p>(iv) Measure volume/height of foam/bubbles/oxygen/gas (in a given time)</p> <p>(b) Concentration/percentage of hydrogen peroxide Time left for pH Temperature of enzyme/tissue <b>Any 2</b></p> <p>(c) Active site/enzyme shape changes/substrate no longer fits</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>1</p>	<p>Foam/energy</p> <p>Inactive catalase/use another enzyme</p> <p>Volume of hydrogen peroxide/test tube Temperature of hydrogen peroxide Not strength Mass of tissue</p> <p>Enzyme denatured</p>	<p>Enzyme died/killed</p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
3	<p>(a) 38</p> <p>(b) <math>Y \rightarrow X</math></p> <p>(c) <b>Name</b> Glycolysis  <b>Product</b> Pyruvic acid/NADH/NADH<sub>2</sub>/  reduced Hydrogen acceptor</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Hydrogen</p>	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
4	<p>(a) X light/sunlight (intensity) Y carbon dioxide (concentration)</p> <p>(b) Number of bubbles/volume of oxygen produced per unit time <b>OR</b> CO<sub>2</sub> uptake/increase in dry mass with time</p> <p>(c) (i) Chlorophyll/chloroplast (ii) Used to split water <b>OR</b> to form ATP <b>OR</b> converted to <u>chemical</u> energy</p> <p>(d) (i) Carbon fixation/Calvin cycle (ii) Glucose</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Volume of carbon dioxide</p> <p>Bubbles of gas Starch production Amount/how much</p> <p>Produce glucose/food</p>	<p>Starch/cellulose</p>



Question	Acceptable Answer	Mark	Unacceptable Answer	Negates																
<p>5 (a)</p> <p>(b)</p>	<p>More squid/food available for seals (to eat) <b>OR</b> Less competition for food</p> <table border="1" data-bbox="443 411 1052 927"> <thead> <tr> <th><i>Statement</i></th> <th><i>True</i></th> <th><i>False</i></th> <th><i>Correction</i></th> </tr> </thead> <tbody> <tr> <td>In this food web krill are <u>herbivores</u></td> <td></td> <td>✓</td> <td>Omnivores/ predator/ prey/ consumer</td> </tr> <tr> <td>The population of <u>sperm whales</u> has the highest biomass</td> <td></td> <td>✓</td> <td>Plant plankton</td> </tr> <tr> <td>The range of species in a <u>population</u> is called biodiversity</td> <td></td> <td>✓</td> <td>Community/ Ecosystem/ habitat</td> </tr> </tbody> </table>	<i>Statement</i>	<i>True</i>	<i>False</i>	<i>Correction</i>	In this food web krill are <u>herbivores</u>		✓	Omnivores/ predator/ prey/ consumer	The population of <u>sperm whales</u> has the highest biomass		✓	Plant plankton	The range of species in a <u>population</u> is called biodiversity		✓	Community/ Ecosystem/ habitat	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>More squid to eat seals</p> <p>Carnivore</p>	<p>Any extra for seals to eat eg fish</p> <p>Not changing the underlined word</p>
<i>Statement</i>	<i>True</i>	<i>False</i>	<i>Correction</i>																	
In this food web krill are <u>herbivores</u>		✓	Omnivores/ predator/ prey/ consumer																	
The population of <u>sperm whales</u> has the highest biomass		✓	Plant plankton																	
The range of species in a <u>population</u> is called biodiversity		✓	Community/ Ecosystem/ habitat																	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
6	<p>(a) (i) WW (both caps/same size)</p> <p>(ii) Male gametes R, W (any order) Offspring RW, RR (RW, RR) (only 1 row on table completed is OK) (<b>OR</b> alternative offspring in line with student gametes)</p> <p>(b) Polygenic</p> <p>(c) Blood group – discontinuous Height – continuous</p> <p style="text-align: right;"><b>Both for 1 mark</b></p> <p>(d) The effect of the environment on phenotype/ appearance</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>roan/red</p>	<p><b>White</b></p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
7	<p>(a) 69</p> <p>(b) Very low</p> <p>(c) x-axis scale and label correct y-axis scale correct Bars for <b>average times</b> plotted accurately (<i>Same width of bars</i>)</p> <p>If both grids completed but not scored through – award the higher mark</p> <p>(d) As light intensity increases, time taken to travel 10cm decreases <b>OR</b> vice versa <b>OR</b> The higher the light intensity, the less time it took (<i>Comparison needed</i>)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Labels not directly under each bar (lose x-axis scale and label mark)</p> <p>4 bars plotted (lose Y-axis scale mark – less than 50%)</p> <p>Move more Reference to one light intensity only</p>	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
8	(a) (i) Prey, secondary <b>Both for 1 mark</b>	1	Litter/noise/methane/gas/waste	
	(ii) 64 (%)	1		
	(b) No effect and no <u>species</u> becomes extinct <b>Both needed</b> <b>OR</b> Decrease and <u>species</u> become extinct/number of <u>species</u> decreases	1		
	(c) Sewage/fertilizers/industry/correct example of waste/oil/acid rain/thermal	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
9	(a) P (salivary) amylase Q pepsin/pepsinogen/rennin	1 1	Saliva/named organ	Using wrong anatomy eg trachea/oesophagus = -1 mark
	(b) <u>Muscles</u> behind food contract + in front (of food) relax <b>Both for 1 mark</b>	1	Muscles contract and relax Tenses up	
	Food is pushed (down the small intestine)	1	Not 'to move the food through' (in stem)	
	(c) Increased surface area/villi/long/folded Thin (gut) wall/lining <b>OR</b> selectively permeable wall/lining Good blood supply/many capillaries <b>Any 2</b>	2	Thin cell walls Blood capillaries Moist	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10	(a) (i) P arrow towards lungs Q arrow towards the body (ignore R if given) Arrows do not have to be inside vessels <b>Both for 1 mark</b>	1		
	(ii) P deoxygenated Q oxygenated <b>Both for 1 mark</b>			
	(b) S <u>left</u> atrium R pulmonary <u>vein</u>	1 1		
	(c) So blood only flows in one direction <b>OR</b> to stop backflow <u>of blood</u>	1		
	(d) Reduces blood (flow)/glucose/oxygen to (heart) muscle/tissues/cells	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p><b>11 (a)</b></p> <p><b>(b)</b></p> <p><b>(c)</b></p>	<p>Y      filtration      more</p> <p style="text-align: right;"><b>3 = 2 marks</b> <b>2/1 = 1 mark</b></p> <p>Liver</p> <p>Osmoregulation</p>	<p style="text-align: center;"><b>2</b></p> <p style="text-align: center;"><b>1</b></p> <p style="text-align: center;"><b>1</b></p>	<p>Osmosis Water balance/regulation ADH Negative feedback</p>	<p>Both options underlined</p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	Alcohol increases (average) reaction <u>times</u>	1	Alcohol decreases reactions	Validity/accurate/for reliable results
(b)	To reduce effect of rogue <u>results</u> /to improve reliability of <u>results</u>	1		
(c)	50 (%)	1		
(d)	Cerebellum	1	Medulla Cerebrum	



## Section C

### Question 1A

- |    |   |   |              |
|----|---|---|--------------|
| L1 | Air/oxygen breathed in through trachea/windpipe/nose/mouth                                      | } | <b>any 2</b> |
| L2 | Air/oxygen passes down through bronchi/bronchioles  |   |              |
| L3 | Air/oxygen moves into alveolus/air sac  |   |              |
| L4 | Oxygen <u>dissolves/diffuses</u> through (moist) lining/wall                                    |   |              |
| B1 | Into red blood cell   | } | <b>any 2</b> |
| B2 | Into capillary/blood/forms oxygenated blood   |   |              |
| B3 | Joins to haemoglobin/forms oxyhaemoglobin   |   |              |
| B4 | Blood taken to heart (via pulmonary vein)   |   |              |
| S1 | From heart via aorta/arteries   | } | <b>any 2</b> |
| S2 | Carried <u>to skin</u> (cells)  |   |              |
| S3 | Oxyhaemoglobin gives up oxygen to (skin) cells/oxygen passes into cells                         |   |              |
| D  | Higher oxygen concentration to lower oxygen concentration<br><b>(award only once in L or S)</b> |   |              |
- max 5**

### Question 1B

- |    |  |   |              |
|----|--|---|--------------|
| C1 | Act as energy store/cell wall structure        | } | <b>any 2</b> |
| C2 | Provide energy (via respiration)               |   |              |
| C3 | Contain C, H and O                             |   |              |
| C4 | Simple sugars/glucose (simple structure)       |   |              |
| F1 | Insulation/warmth/energy store/provides energy | } | <b>any 2</b> |
| F2 | Contain C, H and O                             |   |              |
| F3 | Fatty acids                                    |   |              |
| F4 | Glycerol                                       |   |              |
| P1 | Growth/repair                                  | } | <b>any 2</b> |
| P2 | Contain C, H, O and N                          |   |              |
| P3 | Amino acids                                    |   |              |
- max 5**

## Question 2A

Describe structural adaptations in desert plants and explain how these increase their chances of survival.

### Adaptations

- A1 Roots – long/deep
- A2 Superficial/shallow/under surface roots
- A3 Small leaves/no leaves/spines/needles/thorns/spikes
- A4 Thick waxy cuticle (on leaves) (not skin)
- A5 Succulent tissue/any other correct desert adaptation

**Any 3**

### Explanations – must relate to the correct point above

- E1 (Increases chance of) absorbing water from deep soil (for A1)
- E2 (Increases chance of) absorbing surface water (for A2)
- E3 Decreases/reduces water loss (covers adaptations 3 and 4 – award only once)
- E4 Protects plant from animals (covers adaptation A3)
- E5 Stores water (for A5)/any other correct explanation to match A5

**Any 3**  
**Max 5**

## Question 2B

Describe the differences between the chromosomes in human body cells and human gametes. Explain how these chromosomes are involved in sex determination.

### Differences body cells and gametes

- D1 Zygote/body cells (or named examples) have double sets/diploid/pairs of chromosomes
- D2 Gametes have single set/haploid/half the parent cell chromosome number
- D3 Zygote/body cells have 46/23 pairs of chromosomes
- D4 Gametes have 23 chromosomes

**Any 3**

### Sex determination

- S1 Male gametes/sperm contain X or Y chromosome
- S2 Female gametes/eggs contain an X chromosome
- S3 At fertilisation the zygote is formed  
**OR** at fertilisation the gametes fuse
- S4 XX – Female (human)/XY – Male (human)
- S5 Sperm/male gamete determine the sex of (human) offspring

**Any 3**  
**Max 5**

[END OF MARKING INSTRUCTIONS]