

**2006 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, if a word separated by / are **alternatives**.
4. If two answers are given which contradict one another the first answers 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 words 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
- is 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.

## 2006 Biology Intermediate 2

### Marking scheme

#### Section A

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

**Marking Instructions**

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**Section B**

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p><b>1 (a)</b></p> <p><b>(b) (i)</b></p> <p><b>(ii)</b></p> <p><b>(iii)</b></p>	<p>False bronchi/bronchus/bronchuses</p> <p>True</p> <p>True</p> <p>0·8/·8</p> <p>As (lung) <u>pressure</u> decreases/goes down the <u>volume</u> (of the air in the lungs) increases/goes up OR As <u>volume</u> of air (in the lungs) increases the lung <u>pressure</u> decreases.</p> <p>There is still <u>2·4L</u> of air in the lungs (after breathing out) OR <u>volume</u> (of air in lungs) does not fall to 0</p>	<p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p>	<p>Bronchli/broncholi/bronchious</p> <p>one decreases the other increases</p> <p>when pressure is low volume is high</p> <p>The graph/line never goes to 0</p> <p>The graph begins and ends at 2·4</p>	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
2 (a) (i)	To prevent backflow (of blood)(into the heart/atrium/ventricle) OR So blood can only flow in one direction	1	keep blood flowing in the right direction/allow blood into the heart/control flow	
	(ii) P and M	1		
	(iii) (It would be) reduced Explanation – <u>deoxygenated</u> blood would (leak into left side of heart and) mix with <u>oxygenated</u> blood OR Some blood would be pumped around the body without going to the <u>lungs</u> .	1 1	Less oxygen to the body/cells	
	(b) (i) Renal artery D Pulmonary vein B	<b>Both for 1 mark</b>		
	(ii) Artery <u>walls</u> are thicker/more muscular OR lumen/bore/cavity smaller OR arteries do not contain valves, veins do or vice versa Answer must give a comparison	1	Arteries take blood away from heart veins take blood to heart Arteries are bigger/thicker	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
3 (a) (i)	Maltose	1	glucose/simple sugar/maltase	
	(ii) 35-40	1		
	(b) (i) Specific/specificity	1	Lock and Key	
	(ii) Active site	1	Activation site	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
4	<p>(a) Fat – contains more than/twice as much energy (than carbohydrate and protein) Answer must be comparative</p> <p>(b) Lilac/purple/violet/mauve</p> <p>(c) Nitrogen</p> <p>(d) Calcium – formation/strengthening/repairing of bone /teeth/clotting of blood/contraction of muscles Iron – component of haemoglobin/forming red blood cells</p> <p>Role must be correct for the mineral named. Accept others if biologically correct</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Contains a lot of energy/has a high energy content</p> <p>Pink/blue</p> <p>Salts/water</p>	<p>Any extra wrong colour</p> <p>Any other element</p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
5	(a) (i) (Cell) membrane	1		
	(a) (ii) Controls cell's activities/function(s)/chemical reactions OR Stores/carries/contains <u>genetic/chromosomal/information/genes</u> OR Passes on <u>genetic/chromosomal information/genes</u> OR Stores/carries/contains DNA	1		
	(b) (i) P	1	Swollen/burst	
	(b) (ii) Turgid	1		
	(c) (i) Bacteria	1		
	(c) (ii) Methane	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
6 (a) (i)	12·00/noon/midday	1		
	(ii) 06·00/6·00 and 18·00 or any times in between	1		
	(b) Chlorophyll	1	chloroplast	
	(c) X = Carbon fixation/Calvin cycle Y = CO <sub>2</sub> Z = cellulose	1		1
			Starch/cellulase	starch

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
7 (a) (i)	17.5/18% Accept answer in calculation space	1	Accurate/fair/reliable  To prevent contamination  Movement/respiration/heat/chemical reactions	reliable
	(ii) <u>Start/Initial lengths</u> were different/to standardise results OR To be valid/for validity	1		
	(iii) To prevent cross contamination/to prevent contamination with liquids of different concentrations/mixing the different liquids	1		
	(b) Cell division/protein synthesis/transmission of nerve impulses/glycolysis/growth/repair/heat production/active transport Others acceptable if biologically correct	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p><b>8 (a) (i)</b></p> <p><b>(ii)</b></p> <p><b>(iii)</b></p> <p><b>(iv)</b></p> <p><b>(b)</b></p>	<p>See General Marking Advice No.9</p> <p><u>Scale</u> Correct scale and complete label on X-axis</p> <p><u>Plot</u> Correct plot and line joining them If graph uses less than 50% grid – no scale mark If Bar graph drawn – no plot mark, check scale If line does not go through each point – no plot mark</p> <p>30</p> <p>The oxygen content/it decreases as the distance (from X) increases to 200m The oxygen content/it increases as the distance increases from 200m As distance increases from X the oxygen concentration decreases then increases = 1 mark</p> <p>The large numbers of microbes/bacteria/they had used up the oxygen</p> <p>It is reduced/decreased/lowered OR Reduction in variety</p>	<p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p>	<p>Stating the oxygen concentrations at the sampling points Oxygen increases further away from X</p> <p>There was a large number of microbes</p> <p>Species would die/decrease in species/ population decrease</p>	



Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p><b>10 (a)</b></p> <p><b>(b)</b></p> <p><b>(c)</b></p> <p><b>(d)</b></p>	<p>C A C B</p> <p>(5), 3, 2, 4, 1</p> <p>Produces large quantities of product OR increased range of products OR increased/quicker rate of production OR no allergic reaction to product OR produces desired characteristics OR produces medicines/ accept correct specific examples OR <u>production</u> costs lower</p> <p>Round shape/spines</p>	<p><b>4 = 2 marks</b> <b>3/2 = 1 mark</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p>	<p></p> <p>cheap</p> <p>Fleshy stem/shallow widespread root system</p>	<p>Extra letters</p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<b>11 (a)</b>    <b>(b) (i)</b>  <b>(ii)</b>  <b>(iii)</b>	short homozygous    heterozygous  If 'long' given in first answer, accept only heterozygous and homozygous in second	<b>1</b> <b>1</b>		RR/homozygous non roller
	Jamie – tongue roller Ben – rr	<b>1</b> <b>1</b>		
	100	<b>1</b>		
	XX/both X	<b>1</b>		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a) (i)	A testis cell 46	4 = 2 marks 3/2 = 1 mark		
	B sperm 23			
	C ova/ovum/egg 23			
	D zygote/fertilised egg/ovum 46			embryo/fetus/baby
	(ii) The <u>nuclei</u> of the gametes fuse OR 2 sets of chromosomes are restored	1	sperm enters egg gametes fuse/join/meet	Embryo/fetus/baby
(b) (i)	Chromosome(s)/gene(s)/chromatid(s)/plasmid(s)	1	nucleus	
(ii)	Determines the sequence of amino acids in a <u>protein/enzyme</u> OR Determines the structure/function/type of a <u>protein/enzyme</u>	1		

## Section C

### Question 1A

Stage 1	A1	enzyme controlled	<b>maximum 3 marks</b>
	A2	glucose (in context as raw material)	
	A3	converted to pyruvic acid	
	A4	glycolysis (in context)	
	A5	is anaerobic/oxygen not used	
	A6	energy is released	
	A7	2 ATP produced (per glucose molecule)	
Stage 2	B1	enzyme controlled (if A1 mark not already awarded)	<b>maximum 3 marks</b>
	B2	energy released (if A6 mark not already awarded)	
	B3	pyruvic acid	
	B4	broken down to carbon dioxide and water	
	B5	oxygen required/aerobic	
	B6	36 ATP produced/total of 38 ATP produced (per glucose molecule)	

**TOTAL 5 MARKS**

### Question 1B

Process 1	A1	Diffusion	<b>maximum 3 marks</b>
	A2	movement of <u>substance/molecules/glucose</u> from high to low concentration	
		OR	
		movement of a <u>substance/molecules/glucose down</u> a concentration gradient	
	A3	glucose will move out (of tubing bag)	
	A4	starch will not move (out)	
	A5	glucose molecule small/starch molecule large	
	A6	membrane controls entry/exit	
Process 2	B1	osmosis	<b>maximum 3 marks</b>
	B2	movement/diffusion of <u>water</u> from high to low concentration	
		OR	
		movement/diffusion of <u>water down</u> a concentration gradient through a selectively permeable membrane/semi permeable membrane	
	B3		
	B4	water will move in (through the membrane)	
	B5	water is hypotonic to mixture	
		OR	
		mixture is hypertonic to water	

**TOTAL 5 MARKS**

### Question 2A

Role of small intestine in digestion	A1	food is broken down into <u>small, soluble</u> molecules	<b>maximum 3 marks</b>
	A2	example of substrate and product eg fats → fatty acids and glycerol	
	A3	produces/contains enzymes	
	A4	example of enzyme eg trypsin	
	A5	fats are emulsified (by bile)	
Role of small intestine in absorption	B1	movement/diffusion of <u>soluble</u> food/named example/small molecules through the (intestine) wall	<b>maximum 3 marks</b>
	B2	surface area is increased by being long/folded/villi	
	B3	giving increased/more efficient absorption	
	B4	the lining of the small intestine is thin OR the lining of each villus is thin/one cell thick	
	B5	giving fast diffusion/absorption/movement	
	B6	a villus contains a lacteal and capillaries/capillary network OR labelled diagram showing these	
	B7	amino acids/glucose absorbed into the blood/capillaries	
	B8	fatty acids and glycerol are absorbed into the lacteal/lymphatic vessel	

**TOTAL 5 MARKS**

### Question 2B

Role of hypothalamus	A1	(osmo)receptors present in hypothalamus	<b>maximum 3 marks</b>
	A2	osmoreceptors/hypothalamus stimulated by a change in the water concentration of the <u>blood</u> OR osmoreceptors/hypothalamus detects/senses/monitors the water concentration of the <u>blood</u>	
	A3	a decrease/increase/change in water (concentration) causes an increase/decrease/change in production of ADH	
	A4	hypothalamus stimulates/communicates with/informs/sends a message to the pituitary gland	
	A5	pituitary produces/releases ADH	
Role of ADH	B1	ADH changes the permeability of the (kidney) tubules/collecting ducts	<b>maximum 3 marks</b>
	B2	an increase/decrease in ADH causes more/less water to be reabsorbed OR an increase/decrease in ADH causes more/less water to be absorbed/returned into <u>blood</u>	
	B3	water concentration (of the blood) increases/decreases/returns to normal	
	B4	concentration/volume of urine changes (increases/decreases – must match description)	
	B5	this is an example of negative feedback	

**TOTAL 5 MARKS**

[END OF MARKING INSTRUCTIONS]