



2015 Biology

Intermediate 2

Finalised Marking Instructions

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Part One: General Marking Principles for Biology Intermediate 2

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

- (a) Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.
- (b) Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

GENERAL MARKING ADVICE: Biology Intermediate 2

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 assessments 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 asks 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.

2015 Biology Intermediate 2

Part Two: Marking Instructions for each Question

Section A

Question	Expected Answer(s)	Max Mark
1	B	1
2	A	1
3	D	1
4	A	1
5	A	1
6	C	1
7	B	1
8	D	1
9	B	1
10	C	1
11	A	1
12	C	1
13	D	1

Question	Expected Answer(s)	Max Mark
14	C	1
15	D	1
16	D	1
17	B	1
18	C	1
19	A	1
20	A	1
21	C	1
22	D	1
23	B	1
24	C	1
25	B	1

Section B

Question			Expected Answer(s)	Max Mark	Additional Guidance												
1	(a)		<table border="1"> <thead> <tr> <th>Part</th> <th>Cell Structure</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>D</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Vacuole</td> <td></td> </tr> <tr> <td></td> <td>Nucleus</td> <td>controls <u>cell</u> activities/functions or chemical reactions or contains DNA/genetic information/chromosomes</td> </tr> </tbody> </table> <p>4 correct = 2 marks 3/2/1 correct = 1 mark</p>	Part	Cell Structure	Function	D				Vacuole			Nucleus	controls <u>cell</u> activities/functions or chemical reactions or contains DNA/genetic information/chromosomes	2	Lists mark only first on list NOT All cell activities Controls cell
		Part	Cell Structure	Function													
D																	
	Vacuole																
	Nucleus	controls <u>cell</u> activities/functions or chemical reactions or contains DNA/genetic information/chromosomes															
1	(b)		It has no <u>chloroplasts</u>	1	NOT chlorophyll												
1	(c)		Cellulose	1													
2	(a)	(i)	Starch	1													
2	(a)	(ii)	Iodine (solution)	1													
2	(a)	(iii)	it shows substrate/G-1-P is needed (for reaction)	1	NOT glucose Phosphorylase is specific to G-1-P												

Question		Expected Answer(s)	Max Mark	Additional Guidance												
2	(b)		3	Zero if false with no correction More words OK Not active site on its own												
		<table border="1"> <thead> <tr> <th>Statement</th> <th>True</th> <th>False</th> <th>Correction</th> </tr> </thead> <tbody> <tr> <td>During denaturation, the <u>substrate</u> changes shape.</td> <td></td> <td>✓</td> <td>enzyme</td> </tr> <tr> <td>Amylase is a <u>synthesis</u> enzyme.</td> <td></td> <td>✓</td> <td>Degradation/digestive/catabolic/break down</td> </tr> <tr> <td>Enzymes <u>decrease</u> the energy input needed for a chemical reaction.</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table>			Statement	True	False	Correction	During denaturation, the <u>substrate</u> changes shape.		✓	enzyme	Amylase is a <u>synthesis</u> enzyme.		✓	Degradation/digestive/catabolic/break down
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Enzymes <u>decrease</u> the energy input needed for a chemical reaction.	✓															
3	(a)	<u>Aerobic respiration</u>	1													
3	(b) (i)	Between 2100 and 0300 hours.	1	Will allow 21:00 and 3:00 NOT 9pm and 3am												
3	(b) (ii)	As activity increases rate of oxygen consumption increases to provide more energy Or vice versa	1	Not description only												
3	(c)	Prediction: increase 1 Reason: more <u>energy/ATP</u> needed to maintain body temperature/keep warm/produce heat 1	2													
4	(a)	Name of first stage: photolysis 1 Diffuses out of the leaf: oxygen 1 Two products used in second stage: hydrogen and ATP 1	3	Both answers required												
4	(b)	<ul style="list-style-type: none"> • forms glucose/ starch 1 • <u>ATP</u> provides energy/hydrogen combines with CO₂ 1 	2	Indicate correct and incorrect points and give overall mark												

Question			Expected Answer(s)	Max Mark	Additional Guidance								
5	(a)	(i)	Green plants → rabbits/mice/voles → wildcats → pine martens/foxes	1									
5	(a)	(ii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><i>Term</i></th> <th style="text-align: left;"><i>Named example</i></th> </tr> </thead> <tbody> <tr> <td>habitat</td> <td>(conifer) forest/(dense) woodland/rocky areas</td> </tr> <tr> <td>carnivore</td> <td>pine martens/wildcats/foxes/domestic cats</td> </tr> <tr> <td>prey</td> <td>wildcats/rabbits/mice/voles</td> </tr> </tbody> </table> <p>All correct = 2 2/1 correct = 1</p>	<i>Term</i>	<i>Named example</i>	habitat	(conifer) forest/(dense) woodland/rocky areas	carnivore	pine martens/wildcats/foxes/domestic cats	prey	wildcats/rabbits/mice/voles	2	NOT rocks
<i>Term</i>	<i>Named example</i>												
habitat	(conifer) forest/(dense) woodland/rocky areas												
carnivore	pine martens/wildcats/foxes/domestic cats												
prey	wildcats/rabbits/mice/voles												
5	(a)	(iii)	(they interbreed to) produce fertile offspring	1	NOT compare DNA								
5	(b)	(i)	the number/variety/different/range of species/populations/types of plants and animals/types of organisms	1	NOT variation of species								
5	(b)	(ii)	tree felling/tree thinning/deforestation/more planting space between trees	1	NOT move the trees apart								
6	(a)		<ul style="list-style-type: none"> • remove dark paper/cover completely in dark paper/place in cupboard 1 • add water/wet cotton wool/drying agent in one side only (idea of wet and dry) 1 	2									
6	(b)		use many/more woodlice/repeat the investigation/experiment	1	NOT leave longer One word answer								
6	(c)		(move to more humid areas) to prevent them drying out/helps gas exchange	1	NOT to hide from predators/breathe/get food NOT prefer/like								

Question			Expected Answer(s)	Max Mark	Additional Guidance
7	(a)		<p><i>Site of production</i> <i>Type of gamete</i> <i>Chromosome complement</i></p> <p>2 x site = 1 3 x complement = 1 (extra lines lose marks)</p>	2	
7	(b)	(i)	fertilisation	1	
7	(b)	(ii)	nucleus/nuclei	1	
7	(b)	(iii)	random assortment/independent assortment/crossing over/chiasmata	1	NOT shuffling/meiosis

Question			Expected Answer(s)	Max Mark	Additional Guidance											
8	(a)			2	No mark if different letters but not double penalty											
			<table border="1"> <thead> <tr> <th><i>Individual</i></th> <th><i>Genotype</i></th> <th><i>Phenotype</i></th> </tr> </thead> <tbody> <tr> <td></td> <td>hh</td> <td></td> </tr> <tr> <td></td> <td>Hh</td> <td>non-red hair</td> </tr> <tr> <td></td> <td></td> <td>non-red hair</td> </tr> </tbody> </table> <p>All 4 correct = 2 marks 3/2/1 correct = 1 mark</p>			<i>Individual</i>	<i>Genotype</i>	<i>Phenotype</i>		hh			Hh	non-red hair		
<i>Individual</i>	<i>Genotype</i>	<i>Phenotype</i>														
	hh															
	Hh	non-red hair														
		non-red hair														
8	(b)	(i)		2												
			<table border="1"> <thead> <tr> <th colspan="2"></th> <th colspan="2">Genotype of gametes from B</th> </tr> <tr> <th colspan="2"></th> <th>H</th> <th>h</th> </tr> </thead> <tbody> <tr> <th rowspan="2">Genotype of gametes from D</th> <th>H</th> <td>HH</td> <td>Hh</td> </tr> <tr> <th>h</th> <td>Hh</td> <td>hh</td> </tr> </tbody> </table> <p>genotypes of both gametes correct = 1 all offspring correct (from candidates gametes) = 1</p>					Genotype of gametes from B				H	h	Genotype of gametes from D	H	HH
		Genotype of gametes from B														
		H	h													
Genotype of gametes from D	H	HH	Hh													
	h	Hh	hh													
8	(b)	(ii)	25% OR correct % from wrong offspring in (b) (i)	1												

Question			Expected Answer(s)	Max Mark	Additional Guidance
9	(a)	(i)	Difficult Dark Natural selection All 3 correct = 2 marks 2/1 correct = 1 mark	2	
9	(a)	(ii)	Light/pale colour/white/mossy/lichen covered/no soot	1	NOT clean/light/normal
9	(b)		Stays steady at <u>40</u> then increases to <u>220</u> 1 Change point <u>year 4</u> 1	2	No marks for references to light moths/wrong numbers

Question			Expected Answer(s)	Max Mark	Additional Guidance												
10	(a)	(i)	Distance of food from tube, test tube material/thickness/size, state of food, thermometer position/food completely burned	1	NOT room/starting temperature time taken same equipment used												
10	(a)	(ii)	12.5 and 10.5 (both needed)	1													
10	(b)	(i)	Nitrogen	1													
10	(b)	(ii)	Urea	1													
10	(c)		Fats emulsified/broken down into small droplets/increase surface area/provides alkaline environment	1	NOT breaks down fats												
11	(a)		L – pulmonary vein M – hepatic vein (both needed)	1													
11	(b)		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><i>Type of blood vessel</i></th> <th><i>Thick muscular wall</i></th> <th><i>Valves present</i></th> <th><i>Pulse present</i></th> </tr> </thead> <tbody> <tr> <td>artery</td> <td>yes</td> <td></td> <td>yes</td> </tr> <tr> <td>capillary</td> <td></td> <td>no</td> <td></td> </tr> </tbody> </table> <p>All required for mark</p>	<i>Type of blood vessel</i>	<i>Thick muscular wall</i>	<i>Valves present</i>	<i>Pulse present</i>	artery	yes		yes	capillary		no		1	NOT Y/✓ and N/x
<i>Type of blood vessel</i>	<i>Thick muscular wall</i>	<i>Valves present</i>	<i>Pulse present</i>														
artery	yes		yes														
capillary		no															
11	(c)		Reduced/stops blood flow/oxygen/glucose supply heart attack/angina damages heart muscle/tissue/cells	1	NOT coronary heart disease												
11	(d)		3.5	1													

Question			Expected Answer(s)	Max Mark	Additional Guidance												
12	(a)	(i)	700	1													
12	(a)	(ii)	Y axis scale and exact label with unit (1) All bars at correct height, bars all same width and fill 50% of X axis (1)	2	NOT volume of water loss												
12	(a)	(iii)	45.5	1													
12	(b)		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><i>Problem</i></th> <th><i>Tissues</i></th> <th><i>Urine</i></th> </tr> </thead> <tbody> <tr> <td>dehydration</td> <td><u>hypertonic</u></td> <td>concentrated</td> </tr> <tr> <td><u>influx of water</u></td> <td>hypotonic</td> <td><u>dilute</u></td> </tr> </tbody> </table> <p>All three = 2 2/1 = 1</p>	<i>Problem</i>	<i>Tissues</i>	<i>Urine</i>	dehydration	<u>hypertonic</u>	concentrated	<u>influx of water</u>	hypotonic	<u>dilute</u>	2				
<i>Problem</i>	<i>Tissues</i>	<i>Urine</i>															
dehydration	<u>hypertonic</u>	concentrated															
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13	(a)		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><i>Letter</i></th> <th><i>Part</i></th> <th><i>Function</i></th> </tr> </thead> <tbody> <tr> <td></td> <td>Cerebellum</td> <td>Controls balance Or co-ordination of movement/muscles/motor skills</td> </tr> <tr> <td>P</td> <td></td> <td></td> </tr> <tr> <td>S</td> <td>Medulla</td> <td></td> </tr> </tbody> </table> <p>All 5 = 3 marks 3/4 = 2 marks 2/1 = 1 mark</p>	<i>Letter</i>	<i>Part</i>	<i>Function</i>		Cerebellum	Controls balance Or co-ordination of movement/muscles/motor skills	P			S	Medulla		3	NOT co-ordination and balance Controls motor skills
<i>Letter</i>	<i>Part</i>	<i>Function</i>															
	Cerebellum	Controls balance Or co-ordination of movement/muscles/motor skills															
P																	
S	Medulla																
13	(b)		Hypothalamus Increases Dilate All 3 = 2 marks 2/1 = 1 mark	2													

Section C

Question		Expected Answer(s)	Max Mark	Additional Guidance
1	A	<p>R1 yeast Maximum 1 mark</p> <p>R2 (Yeast) acts on sugar R3 to produce carbon dioxide R4 and alcohol/ethanol R5 this is fermentation R6 enzyme controlled Maximum 2 marks</p> <p>B1 carbon dioxide causes bread/dough to rise Maximum 1 mark</p> <p>W1 sugar in grapes W2 wine contains alcohol/ethanol Maximum 1 mark</p>	5	NOT fermentation of yeast
1	B	<p>A1 amino acids move by diffusion A2 amino acids move out (of the model cell) A3 down the concentration gradient/ high to low concentration A4 amino acids are small molecules A5 starch molecules are too large to pass through the membrane Maximum 3 marks</p> <p>W1 water moves by osmosis W2 water moves in (to the model cell) W3 from high <u>water</u> concentration to low <u>water</u> concentration/hypotonic to hypertonic/down the water concentration gradient W4 model cell gains mass W5 selectively/semi-permeable membrane Maximum 3 marks</p>	5	

Question		Expected Answer(s)	Max Mark	Additional Guidance
2	A	<p>Villus – Accept labelled diagram</p> <p>V1 Lacteal V2 (Blood) capillaries V3 Good blood supply Thin/1 cell thick lining/walls/ selectively permeable Large/ increased surface area</p> <p>G1 Increase <u>diffusion</u> (must be linked to V3)</p> <p style="text-align: right;">Maximum 2 marks</p>	5	
		<p>Absorption</p> <p>P1 Protein converted into amino acids P2 Amino acids move into blood/capillaries F1 Fats converted into fatty acids and glycerol F2 Fats/Fatty acids/glycerol move into lymph/ lacteal</p> <p style="text-align: right;">Maximum 3 marks</p>		Ignore glucose story
2	B	<p>Pathway – Accept labelled diagram</p> <p>P1 Receptor to sensory neurone/nerve P2 Sensory to relay/connector/ association neurone/nerve P3 Relay to motor neurone/nerve P4 Motor to effector/muscle</p> <p style="text-align: right;">Maximum 3 marks</p> <p>Functions</p> <p>F1 Protect/reduce damage/harm/ danger (not prevent) Rapid/involuntary/automatic F2 Muscle contracts F3 Hand/arm pulls away</p> <p style="text-align: right;">Maximum 2 marks</p>	5	

[END OF MARKING INSTRUCTIONS]