2012 Biology

Intermediate 2

Finalised Marking Instructions

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_2, H_2O
    - 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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Section A

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

Section B

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
1 (a) (i)	lactic acid / lactate	**1**		any additional answer
(ii)	yoghurt/cheese/fermented milk drink	**1**	brand names, curds	
(b) (i)	yeast/fungus	**1**		
(ii)	(alcohol) mixed with petrol / gasoline	**1**	any reference to combustion, gas, fuel	
	to form gasohol	**1**		
	OR	**OR**		
	mixed with vegetable oil	**1**		
	to form biodiesel	**1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
2 (a)	mass of substrate/enzyme volume of substrate/enzyme concentration of substrate/enzyme same substrate/enzyme temperature time left to run size of test tube **Any two** **Only 1 from each line**	**2**	amount/measure/quantity percentage volume of solution pH time (single word)/time taken	
(b) (i)	(pH) 8	**1**		
(ii)	5 (times)	**1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
3 (a) (i)	glycolysis	**1**		
(ii)	pyruvic acid/pyruvate	**1**		
(iii)	oxygen/enzymes/ADP+Pi	**1**	phosphate	
(b) (i)	stage 1 = 2/4 stage 1 + 2 = 38/36/40 Only accept 40 if 4 in stage 1 **Both**	**1**		
(ii)	ADP **and** Pi **Both**	**1**	phosphate	Any incorrect numbers
(iii)	muscle contraction/movement/synthesis (of proteins)/growth/cell division/transmission of nerve impulses/heat production/glycolysis (and any other correct) **Any one**	**1**	respiration/photosynthesis/ metabolism/reproduction/heat/ warmth/temperature	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
4 (a)	selectively/semi permeable/has pores OR idea of	**1**	permeable	
(b)	B and D **Both**	**1**		additional letter(s)
(c)	(blotted) dry	**1**	wiping	
(d)	B	**1**		
	has the greatest difference in concentration/concentration gradient	**1**	only restating concentrations from the diagram greatest difference in glucose concentration greatest difference in percentage greatest difference in concentration of solution	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
5 (a) (i)	correct scale on *x*-axis and correct scale on y-axis (more than 50% each axis used)	**1**		
	correct plots and joined	**1**		
(ii)	number of seeds (sown)	**1**	seedlings	
(iii)	the higher the <u>competition</u>, the lower the <u>% of seedlings</u> surviving	**1**	lower percentage seedlings surviving leads to higher competition seeds/plants surviving	
(iv)	4:3	**1**		
(v)	55(%)	**1**		
(b)	light/nutrients/space (any other correct) Any one	**1**	carbon dioxide	food

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
6 (a)	F prey F two T	**1** **1** **1**	food	
(b) (i)	→ water snails → stone loaches → brown trout → heron	**1**		
(ii)	<u>energy</u> flow	**1**	energy	
(c)	energy lost as it passes through the food chain heron has least energy available to build tissues OR fewer heron than any other organism (must be comparative)	**1** **1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
7 (a)	bacterial cell E insulin gene C plasmid D All 3= 1/2=	 **2** **1**		
(b)	plasmid replicated/reproduced/copied/ duplicated OR bacteria/cell multiplied/reproduced/divided	 **1**	grow mitosis	
(c)	growth hormone (any other correct)	**1**	GH	
(d)	increased range of <u>products</u>/increased rate of <u>production</u>/<u>produced</u> quicker large/increased volume/mass of <u>product</u> (or named example)/ lower cost of <u>production</u>/ less/no allergy to <u>product</u> OR an example of moral/ethical issue e.g. <u>product</u> made without killing animals/without infection from human donors	**1**	cheap/quicker process guaranteed product	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
8 (a)	Cell 1 Cell 3 **Both**	**1**		
(b) (i)	meiosis	**1**		
(ii)	Matching/homologous chromosomes pair/random assortment	**1**	shuffling	
	(matching) pairs separate into different cells/single sets/chromosome number halved	**1**		
(c)	zygote nuclei fuse **All 3=** **1/2=**	**2** **1**		

<table>
<tr><th colspan="2">Question</th><th>Acceptable Answer</th><th>Mark</th><th>Unacceptable Answer</th><th>Negates</th></tr>
<tr><td>9 (a) (i)</td><td>lymphocyte/B cells</td><td>1</td><td></td><td></td></tr>
<tr><td>(ii)</td><td>red blood cells/haemoglobin</td><td>1</td><td>RBCs</td><td></td></tr>
<tr><td>(iii)</td><td>oxyhaemoglobin</td><td>1</td><td></td><td></td></tr>
<tr><td>(b)</td><td>% oxygen (in blood) will fall from 91% to 80%/by 11%

<table><tr><td>less oxygen</td><td>causes/ so</td><td>more lactic acid/faster production of lactic acid</td></tr><tr><td>less aerobic</td><td></td><td>less muscle contraction</td></tr><tr><td>anaerobic</td><td></td><td>less energy</td></tr></table>
Answer to include one from each column</td><td>1

1</td><td>Oxygen debt</td><td></td></tr>
</table>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	6	**1**		
(b) (i)	75(%)	**1**		
(ii)	126	**1**		
(c)	used <u>twenty</u> students	**1**	repeated any other number/more than one	any validity points

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	**A** trachea/windpipe **B** bronchus/bronchi **C** bronchioles **All 3=** **1/2=**	 **2** **1**		
(b) (i)	diffusion	**1**		
(ii)	thin walled/large surface area/numerous/ moist (lining)/good blood supply/in close contact with capillaries/moisture layer/one cell thick lining/network of capillaries	**any 2**	they are one cell thick have thin cell walls very thin good surface area large SA	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	<table><tr><td></td><td>Q</td><td></td></tr><tr><td>association/ relay/inter/ connecting neurone/fibre/ nerve</td><td></td><td></td></tr><tr><td></td><td>S</td><td>contracts/moves/ brings about response/stimulated to respond</td></tr></table>		Any example e.g. blinks/withdraws hand Carries out an action/reaction	
	All 4=	**3**		
	3=	**2**		
	2/1=	**1**		
(b)	medulla cerebellum hypothalamus			
	All 3=	**2**		
	1/2=	**1**		
(c)	ADH	**1**		

Section C

Question 1A

N1	any correct named enzyme and substrate	**1**
E1	enzyme has active site	**Max 2**
E2	enzyme lowers energy input/speeds up chemical reactions	
E3	<u>active site</u> is specific/complementary fit/lock and key enzyme-substrate complex	
E4	enzyme unchanged at end/can be reused	
S1	substrate broken down into smaller/more soluble molecules	**Max 2**
S2	named products	
S3	products released from enzyme/active site	

Max 5

Question 1B

P1	<u>light</u> (energy) <u>from lamp</u> absorbed by *Elodea*/plant/chlorophyll/ chloroplast	**Max 3**
P2	energy used to split water	
P3	into H and O	
P4	energy used to produce ATP	
C1	CO_2 <u>in water</u> joins with H	**Max 3**
C2	using (energy from) ATP	
C3	to form glucose	
C4	glucose molecules joined to produce starch (any conversion)	
C5	enzyme controlled	

Max 5

Question 2A

M1 muscles contract and relax
M2 mix/churn <u>food</u> with gastric juices/enzymes/acid/pepsin
M3 physical breakdown of food/smaller pieces/bigger surface area

Max 2

CA1 hydrochloric acid/HCl
CA2 optimum pH for pepsin/enzyme activity
CA3 pepsin/enzyme digest protein
CA4 acid activates pepsin (ogen)

Max 2

CM1 mucus coats/lines stomach wall
CM2 to prevent/protect from damage/digestion by acid/enzyme

Max 2

Max 5

Question 2B

B1 hypothalamus/brain detects rise in <u>blood</u> temperature
B2 hypothalamus receives nerve impulses from skin/thermo receptors
OR hypothalamus sends nerve impulses to skin
B3 negative feedback
B4 any voluntary response to reduce body temperature

Max 2

S1 increased sweating/sweat glands stimulated
S2 increases heat loss by evaporation
S3 blood vessels/arterioles dilate/vasodilation
S4 increasing blood flow to skin/surface vessels
S5 increasing heat loss by radiation
S6 hairs lie flat so less air trapped

Max 3

Max 5

[END OF MARKING INSTRUCTIONS]