

2004 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 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. 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 on 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 questions ask for **letters** and the candidate 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 term 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 mellum, 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 is 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 a candidate gives two answers where there is a choice, mark both and give the higher score.

11. **Annotating scripts:**

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

Marking Instructions

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Section B

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
1 (a) (i)	Volume of starch /amylase /solutions/liquids/buffer/pH solution % of/concentration of starch/amylase/solutions/liquids Weight/mass of starch/amylase; Time	2	Temperature/pH/size of test-tube/depth of tube/ volume of water in bath/amount .../ quantity/measure volume of pH	pH
(ii)	Benedicts/clinistix	1		
(b) (i)	Amylase/enzyme breaks down starch at pH 7/neutral Neutral/pH 7 is optimum for enzyme Enzyme works best at pH7/neutral/enzyme only works at pH7 Enzyme does not work in acids <u>and</u> alkali Ideal conditions at pH7 for enzyme (connection must be made between enzyme and pH)	1	No mention of enzymes Eg. <i>Breakdown of starch works best at pH 7</i> <i>Sugars are only produced at pH 7</i> pH 7 is the optimum pH	
(ii)	Prediction: no simple sugars would be produced/negative reaction (for simple sugars test)/nothing happens/worked Amylase would not work/no starch would break down Explanation: enzyme/amylase has been denatured/inactive Active site destroyed/changed shape (answer may be in prediction)	1 1	No results Enzyme killed/cannot survive/destroyed	
(c)	To produce small/soluble molecules/particles/ <u>simple</u> sugars (or named) Starch <u>molecules</u> too big/complex (must mention size or solubility/complexity) To allow absorption/diffusion to occur For movement into body/cells/blood/gut wall eg <i>starch molecules too large(1) to enter blood(1)</i> Starch not soluble	1 1	To breakdown starch/molecules To absorb starch (from food)/to reabsorb For use in the body (eg for energy) To be transported around the body	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
2 (a)	hypothalamus constrict decreases 3 = 2 marks 2/1 = 1 mark	2		
(b) (i)	D B E A C	1		
(b) (ii)	For protection/defence/to prevent harm/hurt/damage/injury To avoid harm Rapid	1	Detect...../alert..... To avoid danger/pain involuntary	
3 (a)	A= oesophagus/gullet B= duodenum/ <u>small</u> intestine/ileum	1 1	Food pipe Intestine by itself/large intestine	
(b)	Longitudinal/longitude/circular/circle/smooth muscle	1	Circulatory/contracted/sphincter	
(c)	Churns/Mixes food <u>with</u> digestive juices/enzymes/acid/ chemicals Physical/mechanical breakdown of food/liquidises Breakdown of food <u>into small pieces</u> (Breakdown of food) is <u>faster</u>	1	Churn/mix the food Peristalsis/pushes food through Any description of digestion/chemical breakdown	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
4 (a)	Line graph (See General Marking Advice No 9) X-axis scale even + label as table + units (m or metres) Y-axis scale even + label as table + units Points correct and joined Please tick to show each correct plot checked	1 1 1	Graph uses less than 50% of grid – no scale mark Bar graph drawn – no plot mark + check X-axis scale	
(b) (i)	As the height above sea level increases the red blood cell count increases Directly proportional The higher you get the more RBC produced	1	As sea level increases RBC count increases	
(b) (ii)	It increases the chance of oxygen being picked up by the blood/haemoglobin at low oxygen concentrations/high altitude If it didn't increase, there would be a shortage of oxygen in the body/blood/brain To ensure the body/cell are getting <u>enough</u> oxygen To maintain O ₂ level in the blood	1	More oxygen absorbed at higher altitudes More RBC transport more oxygen More RBC because there is less oxygen Makes breathing easier	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
5 (a) (i)	Diffusion	1	Gas exchange/osmosis	Osmosis
(ii)	Carbon dioxide Waste(materials) Water (from contractile vacuole)	1	oxygen	
(iii)	(Cell) membrane	1	(cell) wall	
(b)	To allow carbon dioxide to diffuse/move into the leaf cells/ to absorb carbon dioxide (must indicate correct direction) For photosynthesis / to produce food	1 1	Leaf cells need/receive/use carbon dioxide More carbon dioxide available To store carbon dioxide	need O ₂ for photosynthesis and respiration

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
8 (a)	Glycolysis	1	photolysis glucolysis	
(b)	X= carbon dioxide [Both for 1 mark] Y = oxygen	1		
(c)	Glucose	1		
(d)	ADP + Pi/inorganic phosphate	1	P/2Pi	
(e)	Stage 1 = 2 or 4 Stage 2 = 36	1 1		
(f)	Heat	1	Movement / chemical	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p>9 (a) (i)</p>	<p>Leaves → Capercaillie → fox /Berries /wild cat /stems /crow /blaeberry (leaves/berries/stems) /Pine needles/cones/pine(trees) (forest) plants/vegetation</p>	<p>1</p>		<p>More than 1 species in a box</p>
<p>(ii)</p>	<p>Population (Pine) forest Capercaillie</p> <p>3 = 2 marks 2/1 = 1 mark</p>	<p>2</p>	<p>Forest floor Carnivore/predator Sheep/deer</p>	
<p>(iii)</p>	<p>A (wide) range/variety of plants and animals/species/types/organisms are present</p> <p>Number of <u>different</u> species</p>	<p>1</p>	<p>A large number of plants and animals Variety in the ecosystem Lots of wildlife Variation of species</p>	
<p>(b)</p>	<p>Nests were destroyed/decreased vegetation for nesting Capercaillie competed with (deer/sheep) for food Less food/ more competition</p>	<p>1</p>	<p>Fighting for food</p>	
<p>(c)</p>	<p>Habitat destruction/pollution/deforestation/desertification/ grazing/<u>overfishing</u>/<u>overhunting</u></p>	<p>1</p>		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	(i) Gg (accept gG)	1	not phenotype	phenotype any incorrect answer
	(ii) False Alleles	1	Dominant/recessive	
	True	1	Grey	
	False Heterozygous	1	1 : 4 or 8 : 2	
(iii)	4 : 1	1	It is random parents not true breeding	
(iv)	<u>Fertilisation</u> is a random/chance (process) Some fertilised eggs did not develop/die Numbers in sample are low Some offspring die	1		
(b)	Continuous [Both correct for 1 mark] Discontinuous	1		
(c)	Any correct example of polygenic variation in <u>humans</u> Any feature showing continuous variation eg skin/hair/eye colour/weight/height	1	Blood groups Tongue rolling	

Section C

[Beware not to exceed maximum marks for each section of response]

1. A. The heart

Any 3 marks from

(Right side of heart to and from the lungs)

- R1. X is the right atrium/blood starts in right atrium/auricle
- R2. Blood goes to right ventricle
- R3. Blood goes into the pulmonary artery
- R4. Blood goes to the lungs
- R5. Then back to the heart
- R6. Blood goes along the pulmonary vein

Any 2 marks from

(Left side of heart)

- L1. Blood enters the left atrium/auricle
- L2. Blood goes to the left ventricle
- L3. Blood goes to vessel Y/aorta
- L4. Vessel Y is the aorta

B. Urine production in the nephrons

Any 3 marks from

(Filtration)

- F1. Blood enters the glomerulus
- F2. Filtration (of the blood) occurs
- F3. Ultrafiltration/High pressure in the glomerulus
- F4. Result of filtration/filtered substances/water, glucose, urea (and salts)/(all) small molecules pass (filtrate)
- F5. into the Bowmans capsule/(kidney) tubule

F2./F3. Ultrafiltration in glomerulus = 2 marks

Any 3 marks from

(Reabsorption)

- R1. Reabsorption occurs
- R2. (Reabsorption occurs) along the tubule
- R3. (Useful) Substances (reabsorbed/absorbed) pass into the blood/capillary/any correct named substance eg glucose
- R4. Substances (re)absorbed/include water, glucose, salts
- R5. Urea not (re)absorbed
- R6. Fluid left (after (re)absorption) is urine
- R7. (Urine) passes into the collecting duct
- R8. Urine contains urea, salts and water

[Beware not to exceed maximum marks for each section of response]

2. A.

Adaptations
(max of 3)

Explanations
(max of 3)

- | | |
|-------------------------------------------------------------|---------------------------------------------------------------------|
| A1. Roots (very) long/deep
(underground) | E1 more chance of locating (deep)
water |
| A2. Roots – superficial | E2 more chance of absorbing surface
water (before it evaporates) |
| A3. Small leaves/no leaves/needles/
spines/spikes/thorns | E3 reduces water loss/
reduced SA/protection from animals |
| A4. Reduced surface area of plant/part | E4 reduces water loss |
| A5. Leaves/ thick/ waxy (cuticle/skin)
stem/cuticle | E5 reduces water loss |
- Also accept**
- | | |
|----------------------------------------------------------------|-----------------|
| A6. Succulent tissue/water storage tissue/
thick and fleshy | E6 stores water |
|----------------------------------------------------------------|-----------------|

[Correct adaptation with wrong explanation 1 mark only
eg long roots store water] **accept any other xerophytic adaptations (HA) from**
Higher (HE)

B. **Structure of chromosomes**

Max 3 from

- S1. Contain the genes/genetic code/genetic information
- S2. Composed of DNA
- S3. DNA is made up of bases/name 4 bases or ATGC/nucleotides
- S4. Bases in a chain/sequence
- S5. Chromosomes are composed of two strands/chromatids/or labelled diagram showing these

Explanation

Max 3 from

- E1. Order of bases (is important/needed)
- E2. To determine the sequence of amino acids (in proteins)
- E3. This determines (the type of/shape/structure of) protein produced
- E4. and the properties of the protein/functions of protein
- E5. Proteins produced may be enzymes
- E6. or hormones
- E7. Proteins or Enzymes/hormones/genes/genetic code/genetic information/can affect/determine characteristics/phenotype

[END OF MARKING INSTRUCTIONS]