



National  
Qualifications  
2025

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**2025 Biology**

**National 5**

## **Question Paper Finalised Marking Instructions**

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## General Marking Principles for National 5 Biology

*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 marking instructions, which identify the key features required in candidate responses.*

- (a) Marks for each candidate response must **always** be assigned in line with these general marking principles and the detailed marking instructions for this assessment.
- (b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding; they are not deducted from a maximum on the basis of errors or omissions.
- (c) 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.
- (d) There are no half marks awarded.
- (e) Where a candidate makes an error at an early stage in the first part of a question, credit should normally be given for subsequent answers that are correct with regard to this original error. Candidates should not be penalised more than once for the same error.
- (f) Unless a numerical question specifically requires evidence of working to be shown, full marks should be awarded for a correct final answer (including units, if appropriate) on its own.
- (g) In the detailed marking instructions, if a word is underlined then it is essential; if a word is (bracketed) then it is not essential.
- (h) In the detailed marking instructions, words separated by / are alternatives.
- (i) A correct answer can be negated if:
  - an extra, incorrect, response is given
  - additional information that contradicts the correct response is included.
- (j) Unless otherwise required by the question, use of abbreviations (e.g. DNA, ATP) or chemical formulae (e.g. CO<sub>2</sub>, H<sub>2</sub>O) are acceptable alternatives to naming.
- (k) Where incorrect spelling is given:
  - If the correct word is recognisable then give the mark.
  - If the word can easily be confused with another biological term then do not give the mark eg mitosis and meiosis.
  - If the word is a mixture of other biological words then do not give the mark, eg osmotis, respirduction, protosynthesis.
- (l) Presentation of data
  - If a candidate provides two graphs or charts, mark both and give the higher score.
  - If a question asks for a particular type of graph and the wrong type is given, then full marks cannot be awarded. Candidates cannot achieve the plot mark but **may** be able to achieve the mark for scale and label.
  - If the x and y data are transposed, then do not give the scale and label mark.
  - If the graph used less than 50% of the axes, then do not give the scale and label mark.
  - If 0 is plotted when no data is given, then do not give the plot mark (ie candidates should only plot the data given).
  - No distinction is made between bar graphs and histograms for marking purposes.
  - In a pie chart lines must originate from the central point and extend to tick marks. Labels must be given in full.

- (m) Marks awarded only for a valid response to the question asked. For example, in response to questions that ask candidates to:
- **identity, name, give or state**, they need only answer or present in brief form;
  - **describe**, they must provide a statement as opposed to simply one word;
  - **explain**, they must provide a reason for the information given;
  - **compare**, they must demonstrate knowledge and understanding of the similarities and/or differences between topics being examined;
  - **calculate**, they must determine a number from given facts, figures or information;
  - **predict**, they must indicate what may happen based on available information;
  - **suggest**, they must apply their knowledge and understanding to a new situation.

## Marking Instructions for each question

### Section 1

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

## Section 2

Question			Expected response			Max mark	Additional guidance
1.	(a)	(i)	Structure	Bacterial cell	Fungal cell	1	
			Cell wall	✓	✓		
			Nucleus		✓		
			Mitochondria		✓		
			Ribosomes	✓	✓		
			Plasmid	✓			
			Cell membrane	✓	✓		
			Vacuole		✓		
		(ii)	Cellulose			1	
	(b)		25:20:2			1	
	(c)		Muscle (cells) need/use lots of energy/ATP/have high energy requirement/demand.  <b>AND</b>  for contraction/movement. (1)  Mitochondria is site of (most) ATP production/aerobic respiration. (1)			2	Both parts required for first mark.

Question			Expected response	Max mark	Additional guidance
2.	(a)	(i)	<p>Ion: Potassium. (1)</p> <p>Reason: Higher concentration (of potassium ions) in <b>seaweed</b>.</p> <p><b>OR</b></p> <p>A lower concentration (of potassium ions) in <b>sea water</b>.</p> <p><b>OR</b></p> <p>High concentration (of potassium ions) in <b>seaweed</b> AND low concentration in <b>sea water</b>.</p> <p><b>OR</b></p> <p>Converse. (1)</p>	2	<p>Must be comparative.</p> <p>Must be clear the higher concentration is in the seaweed OR lower concentration is in the sea water.</p>
		(ii)	Active transport	1	
	(b)		Vacuole	1	

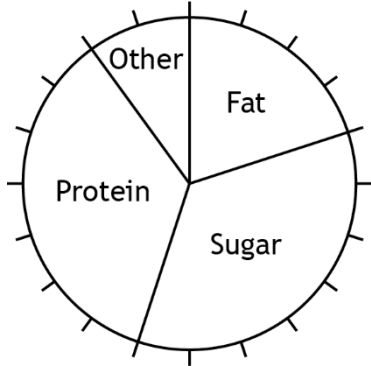
Question			Expected response	Max mark	Additional guidance
3.	(a)	(i)	45	1	
		(ii)	5	1	
		(iii)	Less/no activity/stops	1	Acceptable: zero activity/ decreases/slows down.  Not acceptable: enzyme denatured on its own, zero/0 on its own.
		(iv)	Repeat with more values/temperatures above <b>and</b> below 45°C.  <b>OR</b>  Repeat with more temperatures between 45-55°C.	1	Response must include values around 45°C but not above 55°C.
	(b)		The active site/shape (of invertase/enzyme) is not complementary/specific to starch.  <b>OR</b>  The active site/shape (of invertase/ enzyme) is <b>only</b> complementary/ specific to sucrose.	1	Not acceptable: Enzymes are specific to one substrate.
4.	(a)	(i)	Section of DNA that codes for a protein.	1	Acceptable: sequence of bases that code for a protein.
		(ii)	Extract/remove/cut out the gene.  <b>OR</b>  Insert/seal gene into (bacterial) plasmid.  <b>OR</b>  Cut open (bacterial) plasmid.	1	
	(b)	(i)	112.5	1	
		(ii)	3825	1	
	(c)		Antibodies	1	

Question			Expected response	Max mark	Additional guidance
5.			1. glucose broken down/converted to (2 molecules of) pyruvate 2. pyruvate broken down/ converted to carbon dioxide and water 3. <b>energy is released</b> to yield a large number of ATP  <b>OR</b>  2 ATP produced and a large number of (36) ATP produced 4. respiration begins in cytoplasm and aerobic respiration is completed in the mitochondria 5. controlled by enzymes  <b>Any 4 from 5</b>	4	Arrows as alternatives are acceptable for points 1, 2 and 3. Arrows must have arrow heads →
6.	(a)		Spinal cord	1	
	(b)	(i)	Cerebrum	1	
		(ii)	Controls involuntary/unconscious processes.  <b>OR</b>  Example of involuntary processes eg controls/regulates heart rate/breathing (rate).	1	
	(c)		Detect sensory input/stimuli	1	



Question			Expected response	Max mark	Additional guidance
7.	(a)		Testes	1	
	(b)		<p>Sperm cell is haploid <b>AND</b> cell A/zygote is diploid.</p> <p><b>OR</b></p> <p>Sperm cell contains one <b>set</b> of chromosomes <b>AND</b> cell A/zygote has two <b>sets</b> of chromosomes.</p> <p><b>OR</b></p> <p>Sperm cell has 23 chromosomes <b>AND</b> cell A/zygote has 46 chromosomes.</p> <p><b>OR</b></p> <p>Sperm cell has half the <b>number</b> of chromosomes as cell A/zygote.</p> <p><b>OR</b></p> <p>Cell A/zygote has double/twice the <b>number</b> of chromosomes as sperm cell.</p>	1	<p>Must be comparative.</p> <p>Answer must refer to number of / sets of chromosomes if not using terms haploid and diploid.</p>
	(c)		Mitosis/cell division	1	
	(d)		<p>They have the potential to become different types of cell.</p> <p><b>OR</b></p> <p>They are unspecialised.</p> <p><b>OR</b></p> <p>They can self-renew.</p> <p><b>OR</b></p> <p>They are involved in growth/repair.</p>	1	<p>Acceptable: They can become specialised.</p>
8.	(a)	(i)	rr	1	
		(ii)	Homozygous ✓ as both alleles are the same.	1	Not acceptable: has two small r's.
		(iii)	50	1	
	(b)		Discrete	1	

Question			Expected response	Max mark	Additional guidance												
9.	(a)		Stomata/stoma	1													
	(b)		1	1													
	(c)		To prevent water evaporating/being lost from the soil (which will affect the weight/mass).  OR  To ensure water is only lost from/through the leaves.	1	Not acceptable: to prevent water getting into the soil.												
	(d)	(i)	The starting mass was different (for each plant).	1	Not acceptable: to allow a comparison to be made on its own.												
		(ii)	Most water is lost through the lower surface of the leaf (through transpiration).	1													
10.	(a)	(i)	R	1													
		(ii)	138	1													
	(b)		Description - no nucleus. (1) Explanation - <b>more</b> space to transport <b>more</b> oxygen. (1)  OR  Description - biconcave/large surface area. (1) Explanation - to absorb/transport <b>more</b> oxygen. (1)  OR  Description - biconcave. (1) Explanation - to fit through capillaries to deliver oxygen to cells. (1)	2													
	(c)		Must be comparative. <table><tr><td></td><td>Artery</td><td>Vein</td></tr><tr><td>1 Wall</td><td>Thick / muscular</td><td>Thin/ less muscular</td></tr><tr><td>2 Valves</td><td>Absent</td><td>Present</td></tr><tr><td>3 Channel</td><td>Small/ Narrow</td><td>Large/ Wide</td></tr></table> 1 mark per row		Artery	Vein	1 Wall	Thick / muscular	Thin/ less muscular	2 Valves	Absent	Present	3 Channel	Small/ Narrow	Large/ Wide	3	Must refer to structural differences.
	Artery	Vein															
1 Wall	Thick / muscular	Thin/ less muscular															
2 Valves	Absent	Present															
3 Channel	Small/ Narrow	Large/ Wide															

Question			Expected response	Max mark	Additional guidance
11.	(a)		<p>Athletes put more effort into looking after their teeth or suitable description.</p> <p><b>OR</b></p> <p>Athletes were more likely to brush their teeth twice per day.</p> <p><b>OR</b></p> <p>Athletes floss more regularly.</p> <p><b>OR</b></p> <p>Athletes smoke less.</p> <p><b>OR</b></p> <p>Athletes have better diet.</p>	1	<p>Must be comparative.</p> <p>Converse acceptable if it is clear the response is about the general public.</p> <p>Acceptable: 95% of athletes brush their teeth twice a day compared to 75% of the general public.</p> <p>Acceptable: 44% of athletes floss their teeth regularly compared to 21% of the general public.</p>
	(b)		154	1	
	(c)		<p>Too many variables to control.</p> <p><b>OR</b></p> <p>Difficult to control all variables.</p> <p><b>OR</b></p> <p>Not all variables were controlled.</p> <p><b>OR</b></p> <p>Tooth decay could be caused by other variables.</p>	1	<p>Variables = factors.</p> <p>Not acceptable: An example of an uncontrolled variable on its own.</p>
	(d)		 <p>1 mark for correct labels. 1 mark for correct divisions.</p>	2	<p>Mark for labels can still be awarded if divisions are incorrect.</p> <p>Additional sections (labelled or not) = 0 marks.</p>

Question			Expected response	Max mark	Additional guidance
12.	(a)		Producer - Pine tree/Moss. (1) Predator - Fox/Owl/Woodmouse/Hedgehog. (1)	2	
	(b)		Squirrel population - <b>Increases.</b> Explanation - No squirrels will be eaten by foxes/there are no foxes to eat squirrels. <b>OR</b> Fewer squirrels will be eaten by predators/fewer predators to eat squirrels. Squirrel population - <b>Decreases.</b> Explanation - Less competition/more food for owls, so more owls eat more squirrels. Squirrel population - <b>stays the same.</b> Explanation - combination of both of the above explanations.	1	Acceptable: Squirrels/they have lost a predator/ have fewer predators/less predation/fewer predators .
	(c)		Niche	1	
	(d)		2. pinewood Gingertail (1) 3. go to 4 (1) 4. earpick fungus (1)	3	

Question			Expected response	Max mark	Additional guidance
13.	(a)		15.66/15.7	1	
	(b)		Oxygen	1	
	(c)		ATP	1	
	(d)		Stage - carbon fixation. (1)  Reason - controlled by enzymes/ enzymes are involved/enzymes are affected by temperature. (1)	2	
14.	(a)	(i)	Pitfall trap	1	
		(ii)	Size/area of trap.  Diameter/width of trap.  Shape of trap.  Depth/level of trap.  Type/level of camouflage/cover.  <b>OR</b>  Number/type of leaves.  <b>Any two</b>	2	Not acceptable: any reference to time.  Acceptable: in line/level with surface.
	(b)		Set several traps.  <b>OR</b>  Repeat the investigation/experiment.	1	Not acceptable: reference to other areas/repeat it/amount of traps.
15.	(a)		Pyramid of energy	1	
	(b)		840 000	1	
	(c)		Heat/movement/undigested material/waste.	1	

Question			Expected response	Max mark	Additional guidance
16.	(a)		They can interbreed (with mainland wrens) to produce fertile offspring.	1	Interbreed = mate = breed = reproduce.  Acceptable: Idea of interbreeding to find out if the offspring are fertile or infertile.
	(b)		<div style="border: 1px solid black; display: inline-block; padding: 2px;">C</div> → <div style="border: 1px solid black; display: inline-block; padding: 2px;">D</div> → <div style="border: 1px solid black; display: inline-block; padding: 2px;">B</div> → <div style="border: 1px solid black; display: inline-block; padding: 2px;">E</div> → <div style="border: 1px solid black; display: inline-block; padding: 2px;">A</div>	1	
	(c)		<p>The best adapted individuals (in a population) survive to reproduce. (1)</p> <p>Favourable alleles are passed on (to offspring).</p> <p><b>OR</b></p> <p>Favourable alleles increase in frequency/become more common (within the population). (1)</p>	2	<p>Acceptable: individuals with a selective advantage.</p> <p>Allele = characteristics = traits Gene ≠ allele.</p>

[END OF MARKING INSTRUCTIONS]