

2018 Biology

National 5

Finalised Marking Instructions

© Scottish Qualifications Authority 2018

The information in this publication may be reproduced to support SQA qualifications only on a noncommercial basis. If it is reproduced, SQA should be clearly acknowledged as the source. If it is to be used for any other purpose, written permission must be obtained from permissions@sqa.org.uk.

Where the publication includes materials from sources other than SQA (secondary copyright), this material should only be reproduced for the purposes of examination or assessment. If it needs to be reproduced for any other purpose it is the centre's responsibility to obtain the necessary copyright clearance. SQA's NQ Assessment team may be able to direct you to the secondary sources.

These marking instructions have been prepared by examination teams for use by SQA appointed markers when marking external course assessments. This publication must not be reproduced for commercial or trade purposes.



Downloaded free from https://sqa.my/

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 detailed 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. Marks should be awarded for what is correct and not deducted for 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 should 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 <u>underlined</u> 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 (eg DNA, ATP) or chemical formulae (eg CO₂, H₂0) are acceptable alternatives to naming.
- (k) Where incorrect spelling is given, sound out the word(s).
 - 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.
- (I) 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 uses 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 are awarded only for a valid response to the question asked. For example, in response to questions that ask candidates to:
 - identify, 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	Answer	Mark		
1.	В	1		
2.	С	1		
3.	D	1		
4.	В	1		
5.	С	1		
6.	D	1		
7.	В	1		
8.	С	1		
9.	В	1		
10.	А	1		
11.	D	1		
12.	D	1 1 1		
13.	В			
14.	D			
15.	А	1		
16.	D	1		
17.	С	1		
18.	D	1		
19.	А	1		
20.	С	1		

Question	Answer	Mark		
21.	С	1		
22.	В	1		
23.	А	1		
24.	D	1		
25.	А	1		

Section 2

Q	uestic	on	Expected response	Max mark	Additional guidance
1.	(a)		 Mitochondrion: (site of) <u>aerobic</u> respiration or releases energy/produces ATP. 	2	Acceptable: additional correct information.
			2. Cytoplasm: (site of) chemical reactions.		Not acceptable: - (site of) all chemical reactions - specific example of a reaction eq fermentation
			3. Ribosome(s): (site of) protein synthesis.		
			4. Cell membrane: controls or allows entry/exit of materials/substances/molecules or		Not acceptable: 'things'
			controls what enters/exits. Any 2 for 1 mark each		
	(b)		100	1	
2	(a)		Does not require energy/ATP.	1	Acceptable: additional correct information.
	(b)		2	1	
	(c)		Plasmolysed	1	Not acceptable: flaccid
	(d)		Plant cells/cell 4 have a cell wall or animal cells/cell 3 do not have a cell wall. (1) Cell wall prevents cells from bursting/no cell wall so cell bursts. (1)	2	Not acceptable: cell wall protects it, but would not negate an otherwise correct answer.
3.	(a)	(i)	Double (stranded) helix	1	
		(ii)	Complementary bases or base pairs/base pairing or adenine pairs with thymine and cytosine pairs with guanine.	1	 Acceptable: hydrogen bonds. Not acceptable: use of letters names of bases linked with a (-) dash 'bases' alone.
	(b)		Nucleus	1	

Question		Expected response			Max mark	Additional guidance		
4.	(a)		Degradation/b	reakdow	n		1	
	(b)		 Enzyme an together OR substrate j site OR enzyme-su OR enzyme an complement Reaction o enzyme OR enzyme A anzyme ha (Two/small made/form 	d substra oins/fits/ bstrate c d substra ntary/spe ccurs at <u>a</u> s an <u>activ</u> ler) <u>prod</u> ned/relea	te join/fit/bi /binds with a omplex forms te are ecific. <u>active site</u> of <u>ve site</u> . <u>uct(s)</u> ased.	ind ctive (1) the (1) (1)	3	Do not award mark for point 3 if description relates to
5.	(a)		StatementOxygen is requiredPyruvate is formedLactate is formedCarbon dioxide is formed	Aerobic ✓ ✓ ✓ (1)	Fermentation ✓ ✓ (1)		2	
	(b)		Muscle contrac synthesis/tran impulses/activ	ction/cell smission ⁄e transpo	l division/pro of nerve ort.	tein	1	Acceptable: carbon fixation or any other correctly named example. Not acceptable: - photosynthesis - reproduction.

Question		on	Expected response	Max mark	Additional guidance
6.	(a)	(i)	1.5	1	
		(ii)	4	1	
	(b)		Temperature Volume of pepsin/solution Concentration of pepsin Spacing of holes Size/depth/diameter/volume of holes/wells Any two for 1 mark each	2	Acceptable: amount of pepsin/solution. Not acceptable: - time left for - level of solution - depth of agar.
	(c)		Three values between 0.5 and 2.5 ensuring that there are values above and below the optimum (1.5).	1	If (a)(i) is incorrect, adjust for figures above and below the optimum given, within a similar range. Not acceptable: 0.5 or 2.5
7.			 Chromosomes/chromatids move to/ line up at/across the <u>equator</u>. (1) 	4	Any 4 marks from 6 but must include point 3 and any other three points to get full marks.
			 Spindle (fibres) form/attach/contract/shorten/ pull. (1) (Pairs of) <u>chromatids</u> are separated/pulled apart. (1) Chromosomes move to poles/opposite ends of cell. (1) Nuclear membrane(s) form/develop OR 2 nuclei form. (1) Cytoplasm divides/splits. (1) 		Not acceptable - chromatids move to opposite poles.

Question		on	Expected response	Max mark	Additional guidance
8.	(a)		Testis OR Ovary	1	Singular or plural accepted
	(b)	(i)	Haploid - Haploid Diploid	1	
		(ii)	Zygote	1	
9.	(a)		(Mixture of) genetics and environment(al).	1	
	(b)		Suitable headings for the columns and rows (either order). (1) Correct values included in table (1) (in the absence of suitable headings this mark can be accessed if the context of the values can still be determined).	2	People/adults must be given in the heading of the columns or after every entry.
	(c)		Control (group)	1	
	(d)		 Reliable: as there was a large number of people involved two countries were used (rather than one). OR Not reliable: as there were only two countries/studies involved. 	1	Not acceptable: suggestions of how to improve the study.
	(e)	(e) Any reasonable answer about the people chosen eg gender, diet, age, health issues, drug use, smoking OR about the conditions of the trial eg strength of coffee, time over which it was consumed etc.		1	Not acceptable: - genetics - 'lifestyle' unless accompanied by a suitable example.

Q	Question		Expected response				Additional guidance
10.	(a)		Arteries: 2	and 5		2	1 mark for each correct number.
			Veins: 1 and 3				Accept descriptions in place of numbers.
	(b)	(i)	As the heart rate increases the volume of blood (pumped) increases until 100(bpm) and then decreases.				1 mark for correct description of increase and then decrease (without mention of 100(bpm)).
		(ii)	6.0 / 6			1	
	(c)	(i)	Higher/more in Q (than in P) OR Lower/less in P (than in Q) OR High in Q and low in P			1	 Not acceptable: P is deoxygenated and Q is oxygenated absolute terms eg no oxygen.
		(ii)	Left ventricle			1	
11.	(a)	(i)	G, H, I, J, K	(1	Need all 5
		(ii)	E: tt			2	Additional information negates.
			F: It				If letters other than T or t have been correctly used, only one mark can be awarded.
		(iii)	t	T Tt	t tt	2	If genotypes incorrect in (a) (ii) but carried forward and correctly used, both marks can still be awarded.
			t 1 mark for g 1 mark for d	Tt gametes offspring ge	tt notypes		If no genotypes given in (a) (ii) both marks can still be awarded if the Punnett square is correct.
	(b)		Discrete			1	
12.	(a)	(i)	Palisade me	esophyll		1	
		(ii)	To absorb/capture/trap more light			1	Not acceptable: - to get / receive more light - to absorb light.
	(b)		Xylem: lignin/hollow/no cell contents/no end walls.			1	Not acceptable: Xylem - dead, but not negating.
			Phloem: sieve plates cells.	s/sieve tube	sieve tubes/companion		Not acceptable: Phloem - living, but not negating.
							Any description of function must be related to the structural feature given, otherwise would negate.

Question			Expected response	Max mark	Additional guidance
13.	(a)	(i)	19	1	
		(ii)	(Up to 10 seeds sown, the percentage of seedlings surviving remains constant and thereafter) as the number of seeds (sown) increases the percentage (of seedlings) surviving decreases.	1	Also acceptable: as the number of seeds (sown) decreases the percentage (of seedlings) surviving increases (until 10 seeds and then it remains constant). Not acceptable: percentage of seeds surviving decreases.
		(iii)	They/plants/seeds/seedlings/ organisms are the same species.	1	Not acceptable: any reference to 'fighting'. Any additional reference to requiring resources must be correct.
	(b)		Tick in first box.	1	More than one tick negates.
	(c)		Light/sunlight/nutrients/minerals/ space.	1	Not acceptable: - light intensity - food.
14.	(a)	(i)	Pitfall trap	1	
		(ii)	1. Springtail(1)2. Woodlice(1)	2	
		(iii)	Set several traps. Check traps more often. Repeat the investigation/experiment.	1	Not acceptable: - repeat in different areas.
	(b)	(i)	E	1	
		(ii)	15	1	

Question			Expected response	Max mark	Additional guidance
15.	(a)		X-axis scale and label including units. (1) Plotting and joining points accurately. (1)	2	Scale - any three values to establish a linear scale. If a bar chart is drawn, only the second mark can be accessed. Any extrapolation beyond 50°C in the graph should be ignored.
	(b)		Any value less than 0·4 (including 0).	1	Not acceptable: values below zero.
	(c)		Light intensity/carbon dioxide concentration.	1	
	(d)		Substance X - carbon dioxide $/CO_2$ (1)	2	
			Substance Y - starch (1)		
16.	(a)	(i)	Fertiliser	1	
		(ii)	To make protein/amino acids.	1	
		(iii)	20	1	
	(b)	(i)	(Algal) bloom	1	
		(ii)	Bacteria have more food/more algae to feed on.	1	
		(iii)	Drop in oxygen concentration/lower oxygen concentration/less oxygen for fish due to bacteria using up oxygen.	1	Not acceptable: - no oxygen - bacteria use up all the oxygen.

[END OF MARKING INSTRUCTIONS]