National
Qualifications
2019

2019 Biology

National 5

Finalised Marking Instructions

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These marking instructions have been prepared by examination teams for use by SQA appointed markers when marking external course assessments.

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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 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. 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 <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 CO_2, H_20) 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.

(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 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:

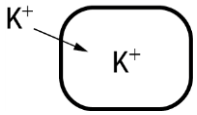
- **identify, name, give** or **state**, they need only answer or present in brief form;
- **describe**, they must provide a statement as opposed to simply one word;
- **explain**, they must provide a reason for the information given;
- **compare**, they must demonstrate knowledge and understanding of 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.	A	**1**
2.	D	**1**
3.	B	**1**
4.	D	**1**
5.	B	**1**
6.	C	**1**
7.	A	**1**
8.	C	**1**
9.	B	**1**
10.	A	**1**
11.	D	**1**
12.	A	**1**
13.	D	**1**
14.	A	**1**
15.	C	**1**
16.	C	**1**
17.	B	**1**
18.	B	**1**
19.	C	**1**
20.	D	**1**
21.	A	**1**
22.	B	**1**
23.	D	**1**
24.	B	**1**
25.	D	**1**

Section 2

Question			Expected response	Max mark	Additional guidance
1.	(a)	(i)	Controls/allows entry/exit of materials/substances/molecules **OR** Controls what enters/leaves	**1**	Not acceptable: 'Things' Decides what enters/exits the cell To be selectively permeable (not negating otherwise correct answer)
		(ii)	Ribosome	**1**	Acceptable: Cytoplasm
	(b)	(i)	285	**1**	
		(ii)	They have high(er) energy requirements/need lots of/use more energy **OR** They require high(er) levels/lots of/use more ATP	**1**	If example is given it must apply to both types of cells. Not acceptable: Produce more energy (negates an otherwise correct answer)
2.	(a)		Diffusion	**1**	
	(b)	(i)		**1**	Must be an indication of direction not just a line.
		(ii)	Protein(s)	**1**	
	(c)		29	**1**	
3.	(a)		Amylase	**1**	
	(b)		Synthesis	**1**	
	(c)		Cellulose	**1**	
	(d)		Substrate	**1**	

<table>
<tr><th colspan="3">Question</th><th>Expected response</th><th>Max mark</th><th>Additional guidance</th></tr>
<tr><td>4.</td><td>(a)</td><td>(i)</td><td>S Pyruvate (1)
T Water (1)</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Oxygen</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>(iii)</td><td>2</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>Scale, label (1)
Points plotted and line drawn (1)

<table><tr><th>Time (minutes)</th><th>Volume of dough (cm^3)</th></tr><tr><td>10</td><td>8</td></tr><tr><td>20</td><td>14</td></tr><tr><td>30</td><td>22</td></tr><tr><td>40</td><td>26</td></tr><tr><td>50</td><td>28</td></tr><tr><td>60</td><td>28</td></tr></table></td><td>2</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Prediction - Any value greater than 0 cm^3 and less than 28 cm^3 (1)

Reason - <u>Enzymes</u> (in the yeast) not as active/less active (1)</td><td>2</td><td>Must be comparative</td></tr>
<tr><td>5.</td><td>(a)</td><td></td><td>(Embryonic) stem (cells)</td><td>1</td><td>Not acceptable:
Adult/tissue stem (cells)</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Organ(s)</td><td>1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>Repair (tissues/organs)
OR
Replace (dead/damaged) cells</td><td>1</td><td>Not acceptable:
Repair (dead/damaged) cells</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Phagocytes engulf/digest pathogens (1)

Lymphocytes produce/release antibodies (1)</td><td>2</td><td>Not acceptable:
Phagocytes destroy/surround pathogens/carry out phagocytosis (not negating otherwise correct answer)

Phagocytes eat (negates an otherwise correct answer)</td></tr>
<tr><td></td><td>(e)</td><td></td><td>Immune</td><td>1</td><td></td></tr>
</table>

Question			Expected response	Max mark	Additional guidance
6.	(a)		19:00	**1**	Acceptable: 7pm
	(b)		30	**1**	
	(c)		1. Pancreas produces/releases glucagon **(1)** 2. (Glucagon) travels in the blood **(1)** 3. To the liver/in the liver **(1)** 4. Glycogen is broken down into glucose **(1)** 5. Glucose is released (into the blood) **(1)**	**4**	To achieve 4 marks candidate must include: Points 1, 3 and 4 **AND** Either points 2 or 5 4. Acceptable: Glycogen is converted/turned into glucose
7.	(a)	(i)	(Both) alleles are the same/identical	**1**	Not acceptable: Both genes are the same
		(ii)	F1 were (all) tall/none of the F1 were dwarf **OR** There were more tall/less dwarf overall	**1**	
	(b)	(i)	108	**1**	
		(ii)	5:2	**1**	
8.	(a)		A – fatty acids/glycerol **(1)** B – glucose/amino acids **(1)**	**2**	Not acceptable: Sugar
	(b)		Increases/provides/creates/gives a large surface area	**1**	
	(c)		Thin walls/walls one cell thick **OR** Good/extensive blood supply or description	**1**	Not acceptable: Thin cell walls

Question			Expected response	Max mark	Additional guidance
9.	(a)		30	**1**	
	(b)		27	**1**	
	(c)		**Any one of:** The 1st injection takes 28 days to reach the maximum (concentration), whereas the 2nd injection takes 27 days (to reach the maximum concentration) **OR** The 1st injection • increases slower • takes longer to reach its maximum (concentration) • is slower to reach its maximum (concentration) **OR** The 2nd injection • increases faster • takes less time to reach its maximum (concentration) • is quicker to reach its maximum (concentration) **(1)** **Any one of:** 1st injection – higher for a shorter period of time/decreases faster **OR** 2nd injection – higher for a longer period of time/decreases slower **(1)** **OR** Any other suitable difference **(1)**	**2**	Any 2 marks from 3 Not acceptable (in question stem): 1st injection produces less antibodies/2nd injection produces more antibodies Not acceptable: 1st injection longer/slower/takes 28 days Not acceptable: 2nd injection shorter/faster/takes 27 days Not acceptable: 1st/2nd injection higher/increases
	(d)		84	**1**	

Question			Expected response	Max mark	Additional guidance
10.	(a)		Does exercise reduce/affect the risk/chance of cancer?	**1**	
	(b)		Bar	**1**	
	(c)		Participants could have forgotten/ exaggerated/under-estimated/not told the truth (about recording their own exercise)	**1**	
	(d)		Age - participants should be the same age/similar ages Duration - participants should exercise for the same length of time Type - participants should carry out the same exercise	**1**	
11.	(a)	(i)	Photosynthesis	**1**	
		(ii)	Carnivore/predator/prey	**1**	Not acceptable: Secondary consumer
		(iii)	(Pyramid) A	**1**	
	(b)	(i)	15	**1**	
		(ii)	Growth	**1**	Extra boxes ticked negates

Question			Expected response	Max mark	Additional guidance
12.	(a)		As the soil moisture increases, the (percentage) ground cover/moss increases **OR** The higher the soil moisture, the higher the ground cover **OR** The lower the soil moisture, the lower the ground cover	**1**	
	(b)		Repeat the (whole) investigation **OR** Do more quadrats AND soil moisture readings **OR** (Use) more sample sites	**1**	Not acceptable: Repeat it/repeat the experiment/ take more measurements/readings/ samples
	(c)	(i)	Insert thermometer into soil same depth each time **OR** Leave for a time to adjust before reading	**1**	
		(ii)	pH/light intensity/wind speed/ humidity/mineral concentration/ nitrate concentration	**1**	Not acceptable: Light
	(d)	(i)	Species that by their presence or absence indicate (levels of) pollution/environmental quality	**1**	
		(ii)	4	**1**	

Question			Expected response	Max mark	Additional guidance
13.	(a)	(i)	Control	**1**	Extra boxes ticked negates
		(ii)	To allow a comparison to those where carbon dioxide and/or light have been removed **OR** To show that carbon dioxide and/or light are required	**1**	Not acceptable: For comparison
		(iii)	There are two variables altered/ both carbon dioxide and light are absent **OR** Carbon dioxide is absent/a chemical is absorbing carbon dioxide AND light absent/in a black box	**1**	
		(iv)	Light	**1**	Not acceptable: Dark/lack of light/light intensity
	(b)		Sugar	**1**	Acceptable: Glucose
14.	(a)	(i)	7·2 (million)	**1**	If answer not in the table then million is required
		(ii)	Not caused by bacteria/pathogen is not a bacterium	**1**	Not acceptable: Antibiotics do not affect viruses Common cold is caused by a virus Resistant to antibiotics
	(b)	(i)	(D) A E C B	**1**	
		(ii)	Natural selection/survival of the fittest	**1**	
		(iii)	Radiation/some chemicals Named examples of either	**1**	

Question			Expected response	Max mark	Additional guidance
15.	(a)		Chromosome(s)	**1**	
	(b)		Any reference to required gene being extracted should be ignored (including any reference to enzymes) 1. Plasmid extracted from bacteria/bacterial cell **OR** Plasmid cut open **(1)** 2. (Required) gene inserted into plasmid **(1)** 3. (Modified) plasmid inserted into a bacterial/host cell **(1)** 4. A correct mention of enzyme cutting plasmid **OR** Sealing gene into plasmid **(1)**	**4**	Not acceptable: 3. Any implication that the plasmid is returned to the original bacterial cell 4. Any other use of enzyme negates

[END OF MARKING INSTRUCTIONS]