National Qualifications 2024

2024 Biology

National 5

Question Paper Finalised Marking Instructions

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Marking Instructions for each question

Section 1

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

Section 2

Question			Expected response	Max mark	Additional guidance
1.	(a)	(i)	Nucleus	**1**	
		(ii)	(Site of) photosynthesis	**1**	
	(b)		It has no cell wall/vacuole	**1**	Also acceptable: no mitochondria
	(c)		1950	**1**	
2.	(a)		Any value **between** (+)11 and (+) 17	**1**	
	(b)		1	**1**	
	(c)		5.46/5.5	**1**	
3.	(a)	(i)	Substance J: Pyruvate **(1)** Substance K: Water **(1)**	**2**	
		(ii)	2	**1**	
	(b)		Mitochondrion/mitochondria	**1**	
	(c)		No oxygen/When oxygen is absent/ not enough oxygen/low levels of oxygen/low O_2	**1**	Not acceptable: need/require oxygen
4.	(a)	(i)	Synthesis	**1**	
		(ii)	Glucose-1-phosphate/G1P	**1**	
	(b)	(i)	So that only starch made (during the experiment) would be detected. **OR** To prove that the starch present has been made (during the experiment).	**1**	Answer must imply the starch is being made in the experiment.
		(ii)	Volume of G1P/substrate Volume of (potato) extract/enzyme Volume of water Concentration of G1P/substrate Concentration of (potato) extract /enzyme **Any 2**	**2**	Not acceptable: – Mass/weight of potato(es) – Any mention of temperature – Any mention of pH
	(b)	(iii)	Starch is **produced** when the (potato) extract/enzyme is present or converse. There is no starch **produced** in 2nd row/control.	**1**	Answer must refer to starch production rather than presence.

Question			Expected response	Max mark	Additional guidance
5.	(a)		2.6	**1**	
	(b)		37.5	**1**	
	(c)		1.8	**1**	
6.	(a)	(i)	Neuron Y = Sensory (neuron) **(1)** Neuron Z = Motor (neuron) **(1)**	**2**	
		(ii)	Chemicals	**1**	Also acceptable: neurotransmitters/ chemical messages Not acceptable: chemical messengers
	(b)		Muscle	**1**	Not acceptable: gland
	(c)		Protects (the body/hand/finger) from harm	**1**	Also acceptable: protects (the body/hand/finger) from danger
7.	(a)	(i)	Ovary/ovaries	**1**	
		(ii)	Sperm nucleus and egg nucleus fuse or join together/sperm and egg nuclei fuse/gamete nuclei fuse or join together	**1**	Must be clear it is the two nuclei which are involved.
		(iii)	Zygote	**1**	
	(b)		(Embryonic) stem (cells)	**1**	
8.	(a)	(i)	Affected Unaffected	**1**	
		(ii)	Heterozygous	**1**	
		(iii)	3	**1**	
	(b)		Male genotype rr Female genotype rr	**1**	
	(c)		Allele(s)	**1**	

<table>
<tr><th colspan="3">Question</th><th>Expected response</th><th>Max mark</th><th>Additional guidance</th></tr>
<tr><td>9.</td><td>(a)</td><td></td><td>Lymphocyte(s)</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>Heading
<table><tr><td rowspan="2">Symptoms of long covid</td><td colspan="2">Percentage of patients (%)</td></tr><tr><td>Start of study</td><td>End of study</td></tr></table></td><td>1</td><td>Not acceptable: symptoms alone/ symptoms of covid</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Relevant data
<table><tr><td>Extreme breathlessness</td><td>38</td><td>30</td></tr><tr><td>Memory and concentration issues</td><td>48</td><td>38</td></tr><tr><td>Other health issues</td><td>57</td><td>45</td></tr></table></td><td>1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>5 : 13 : 2</td><td>1</td><td></td></tr>
<tr><td></td><td>(d)</td><td></td><td>Too many variables to control/ difficult to control all variables/ symptoms could be caused by other factors</td><td>1</td><td>Accept correct example of a variable eg. age/gender/ethnicity/previous underlying health issues/lifestyle choices</td></tr>
</table>

Question			Expected response	Max mark	Additional guidance
10.	(a)	(i)	Right ventricle	**1**	
		(ii)	Higher/more in N (than in L) **OR** Lower/less in L (than in N) **OR** High in N **and** low in L	**1**	Must be comparative Not acceptable: - L is oxygenated and N is deoxygenated - absolute terms eg no carbon dioxide.
	(b)	(i)	Coronary artery	**1**	
		(ii)	No oxygen/glucose/nutrients **(1)** No ATP produced/no energy released **(1)**	**2**	
11.	(a)		• Large surface area • Thin walls • Extensive blood supply or suitable description **Any 2**	**2**	Also acceptable: dense capillary network or suitable description Not acceptable: - Thin cell walls - Thin on its own
	(b)		As the temperature (of the water) increases (average) breathing rate increases **OR** As the temperature (of the water) decreases (average) breathing rate decreases	**1**	Must show correct causation Must refer to rate/breaths per minute and not just breaths
12.	(a)	(i)	32	**1**	
		(ii)	Carry out more transects/use more sites (along the transect)/use more quadrats Repeat the investigation/ experiment	**1**	Not acceptable: repeat (it)
	(b)	(i)	Indicator (species)	**1**	
		(ii)	Abiotic (factors)	**1**	

Question			Expected response	Max mark	Additional guidance
13.	(a)	(i)	As carbon dioxide (concentration) increases the (mass of) sugar produced increases until 0.08(%) **(1)** then levels off **(1)**	**2**	Must show correct causation to access any marks 1 mark for correct description of increase then levels off [without mention of 0.08(%)]
		(ii)	Temperature **OR** Light intensity	**1**	Not acceptable: light on its own
	(b)	(i)	Splitting of water/water is split	**1**	
		(ii)	Substance: Cellulose **(1)** Role: Structural/to make (plant) cell wall/component of cell wall **(1)**	**2**	
14.			**Role of pond weed** **1.** Pond weed is a producer/makes its own food/carries out photosynthesis **OR** Pond weed is a source of energy/food for the tadpole/ (primary) consumer **Energy at each level** 2. Pond weed/producer converts light energy into chemical energy 3. Energy is transferred/passed on from one level to the next 4. Only a (very) small quantity is used for growth AND is available at the next level 5. Majority of energy is lost 6. as heat/movement/undigested materials/faeces 7. Energy decreases/is lost (at each level in the food chain) **OR** Pond weed has the most energy **AND** pike has the least energy	**4**	Also acceptable: energy is transferred/passed on from one **named** organism to another ≤ 10% = small ≥ 90% = majority

Question			Expected response	Max mark	Additional guidance
15.	(a)		Nitrate(s)	**1**	Also acceptable: nitrogen, potassium, phosphorous or any other correct example
	(b)	(i)	Y-axis scale and label including units **(1)** All disease bars at correct height **(1)** <table><tr><th rowspan="2">Crop</th><th colspan="2">Average loss in yield (%)</th></tr><tr><th>Insects</th><th>Disease</th></tr><tr><td>Wheat</td><td>4</td><td>7</td></tr><tr><td>Barley</td><td>7</td><td>6</td></tr><tr><td>Oats</td><td>8</td><td>14</td></tr><tr><td>Oil seed rape</td><td>8</td><td>12</td></tr></table>	**2**	Scale - any three values to establish a linear scale
		(ii)	Wheat	**1**	
		(iii)	Barley shows a greater loss to insects than disease	**1**	Also acceptable: – Barley is affected more by insects than disease
		(iv)	175 000	**1**	
	(c)		Bioaccumulation	**1**	
	(d)		Biological control	**1**	
16.	(a)		Geographical/Ecological/Behavioural	**1**	Named example alone is not acceptable
	(b)	(i)	DNA	**1**	
		(ii)	Radiation **OR** Chemicals	**1**	Also acceptable: named radiation Also acceptable: named chemical
	(c)		Competition for food **OR** (Type/source of) food available	**1**	
	(d)		(A group of) organisms that can interbreed to produce fertile offspring.	**1**	Answer must imply • there is more than one organism • breed/mate/reproduce • production of fertile offspring

[END OF MARKING INSTRUCTIONS]

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 <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:
- 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.