National
Qualifications
2017

2017 Biology

National 5

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

(a) Marks for each candidate response must <u>always</u> 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 (e.g. DNA, ATP) or chemical formulae (e.g. CO_2, H_20) are acceptable alternatives to naming.

(k) 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 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 questions 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 anew situation.

Marking instructions for each question

Section 1

Question	Answer	Max Mark
1.	B	**1**
2.	D	**1**
3.	A	**1**
4.	B	**1**
5.	B	**1**
6.	B	**1**
7.	D	**1**
8.	C	**1**
9.	D	**1**
10.	A	**1**
11.	A	**1**
12.	C	**1**
13.	B	**1**
14.	A	**1**
15.	C	**1**
16.	C	**1**
17.	D	**1**
18.	C	**1**
19.	B	**1**
20.	C	**1**

Section 2

Question			Expected answer(s)	Max mark	Additional guidance
1.	(a)	(i)	Cytoplasm – site of (chemical) reactions **OR** Cell membrane – controls/allows/lets entry and/or exit/passage of materials/substances/molecules **or** Controls what enters/exits **OR** Nucleus – controls (all) cell activity/activities	**1**	Not acceptable – things/particles Not acceptable – contains genetic material; but not negating
		(ii)	Osmosis	**1**	
	(b)		Cell wall	**1**	
2.	(a)	(i)	3 Pairs of chromatids are pulled apart	**1**	No penalty for any other number in any other place – ignore. More than one '3' negates
		(ii)	Spindle (fibre)	**1**	
	(b)		40	**1**	
3.	(a)		1 = cytosine 2 = thymine	**2**	Not acceptable – letters instead of words, thyamine/thiamine
	(b)		Sequence/order of bases	**1**	Accept – examples of differing base order Not acceptable – reference to pairs of bases
	(c)		Messenger RNA/mRNA/MRNA	**1**	
4.	(a)		Appropriate scale and label **(1)** Scale must have 0, 108 or 120 and one other number in between Label - Time (taken) for disc(s) to return to (the) surface s/seconds Bars correctly plotted **(1)**	**2**	Not acceptable - common zero on scale Not acceptable - 'secs' as an abbreviation If incorrect scale but plot is accurate to that scale (1 mark)
	(b)		Liver has the highest catalase activity/apple has the lowest catalase activity/different tissues have different catalase activity/ animal tissue has higher catalase activity (than plants) or other appropriate conclusion	**1**	Answer must relate to catalase activity/rate and be comparative Not acceptable - restatement of results
	(c)		Decrease	**1**	

Question			Expected answer(s)	Max mark	Additional guidance
5.	(a)	(i)	1·3	**1**	Acceptable - correct answer but not in table
		(ii)	Temperature	**1**	
		(iii)	(Respiration is) controlled by enzymes/enzymes are needed **1** Enzymes have been denatured (at 60°C) or description of denatured **1**	**2**	Enzymes must be mentioned at least once for both marks to be awarded. Not acceptable - reference to denaturing at temperatures 'above optimum'
		(iv)	To show it is the **germinating/live** peas that are producing the result/using oxygen/respiring **OR** To show that <u>dead</u> peas do not respire	**1**	Reference to 'temperature having no effect on dead peas' does not negate an otherwise correct answer
	(b)		X – Pyruvate **OR** Y – Ethanol/alcohol	**1**	
6.	(a)		Discrete **(1)** Heterozygous **(1)**	**2**	
	(b)	(i)	Testis/testes	**1**	Accept testicles
		(ii)	Sperm <u>nucleus</u> and egg <u>nucleus</u> fuse or join together/sperm and egg <u>nuclei</u> fuse/gamete <u>nuclei</u> fuse or join together	**1**	Must be clear it is the two nuclei which are involved
		(iii)	Haploid cell or egg has half the number of chromosomes **OR** Diploid cell or zygote has double/twice the number of chromosomes **OR** Haploid cell or egg has one set of chromosomes/ 23 chromosomes whereas diploid cell or zygote has two sets of chromosomes/46 chromosomes	**1**	Must refer to chromosomes Accept – sex cell or gamete as an alternative to egg

Question			Expected answer(s)	Max mark	Additional guidance
7.	(a)		11:7	**1**	
	(b)	(i)	Oxygen/nutrients/glucose/amino acids	**1**	Not acceptable – food/blood
		(ii)	Reduce/stop smoking Reduce fat in diet/cholesterol in diet/salt intake/sugar intake/ alcohol intake/stress Lose weight/healthier diet/ healthier eating	**1**	Must be comparative or imply change
	(c)		(Large) surface area /(rich) blood supply/(dense) capillary network	**1**	
8.	(a)		150	**1**	
	(b)	(i)	Will be less evaporation/water loss **OR** Plant will not require as much water	**1**	
		(ii)	Dry	**1**	
9.	(a)		Cerebellum	**1**	
	(b)		1. Detected by receptors **(1)** 2. Sent by electrical impulse/ signal **(1)** 3. (Message/information/ impulse goes) from sensory to relay neuron/sensory → relay neuron **(1)** 4. Across synapse **OR** Chemical transfer between neurons **(1)**	**4**	If the brain is mentioned as being **involved** in the process this negates one correct point. Not acceptable – reference to 'electrical impulse' crossing synapse
10.	(a)	(i)	Pancreas	**1**	Not acceptable - pancrease
		(ii)	Glucose is needed to release/give out energy **OR** If cells do not have glucose they release/give out less/no energy	**1**	
	(b)	(i)	S	**1**	
		(ii)	P	**1**	
	(c)		Receptor (protein)	**1**	

<table>
<tr><th colspan="3">Question</th><th>Expected answer(s)</th><th>Max mark</th><th>Additional guidance</th></tr>
<tr><td>11.</td><td>(a)</td><td></td><td>Set up more than one field for each variety/
Repeat the (whole) investigation/
Use more potatoes/plants in each field</td><td>1</td><td>If 'both varieties' are mentioned, it must be clear that each variety is grown in a separate field

Not acceptable - repeat it/ repeat the experiment</td></tr>
<tr><td></td><td>(b)</td><td></td><td>175</td><td>1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>Number of potatoes/plants;
Spacing between potatoes/plants;
pH of soil;
Nutrient content of soil;
Moisture content of soil;
Fertility of soil;
Type of soil</td><td>1</td><td>Not acceptable-
Amount of potatoes
Temperature
Humidity
Light intensity
Rainfall
CO_2 concentration
Area/size of field</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Pesticides/insecticides/predator/ biological control/crop rotation</td><td>1</td><td></td></tr>
<tr><td>12.</td><td>(a)</td><td></td><td>Niche</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>Mutation</td><td>1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>(Offspring would be) infertile/ sterile</td><td>1</td><td>Not acceptable – offspring are unable to reproduce, but not negating</td></tr>
<tr><td>13.</td><td></td><td></td><td></td><td>3</td><td></td></tr>
<tr><td colspan="6">
<table>
<tr><th>Statement</th><th>True</th><th>False</th><th>Correction</th></tr>
<tr><td>Genetic variation within a population allows the population to <u>adapt</u> in a changing environment.</td><td>✓</td><td></td><td></td></tr>
<tr><td>Isolation barriers can be geographical, <u>environmental</u> or reproductive.</td><td></td><td>✓</td><td>Ecological</td></tr>
<tr><td>Sub-populations evolve until they become genetically <u>identical</u>.</td><td></td><td>✓</td><td>Non-identical/varied/ different</td></tr>
</table>
</td></tr>
</table>

Question			Expected answer(s)	Max marks	Additional guidance
14.	(a)	(i)	Nitrites	**1**	
		(ii)	3 **OR** 4	**1**	
	(b)	(i)	Plants/producers/denitrifying bacteria	**1**	Not acceptable – named example/leguminous plants
		(ii)	To make protein/amino acids	**1**	Not acceptable - to grow
	(c)		Fungi	**1**	
15.	(a)	(i)	Has most crusty lichen **and** these are common/found in high pollution	**1**	
		(ii)	6	**1**	
	(b)		Indicator (species)	**1**	

[END OF MARKING INSTRUCTIONS]