National Qualifications 2016

2016 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. 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 a multi-stage calculation, credit should normally be given for correct follow-on working in subsequent stages, unless the error significantly reduces the complexity of the remaining stages. The same principle should be applied in questions which require several stages of non-mathematical reasoning.

(f) Unless a numerical question specifically requires evidence of working to be shown, full marks should be awarded for a correct final answer (including unit, if appropriate) on its own.

(g) Where a wrong answer (for which no credit has been given) is carried forward to another step, credit will be given provided the end result is used correctly.

(h) In the mark scheme, if a word is <u>underlined</u> then it is essential; if a word is (bracketed) then it is not essential.

(i) In the mark scheme, words separated by/are alternatives.

(j) If two answers are given where one is correct and the other is incorrect, no marks are given.

(k) Clear indication of understanding is what is required, so:

- if a description or explanation is asked for, a one word answer is not acceptable
- if the question asks for letters and the candidate gives words and they are correct, then give the mark
- if the question asks for a word to be underlined and the candidate circles the word, then give the mark
- if the result of a calculation is in the space provided and not entered into a table and is clearly the answer, then give the mark
- chemical formulae are acceptable eg CO_2, H_2O
- contractions used in the Course Support Notes eg DNA, ATP are acceptable
- words not required in the syllabus can still be given credit if used appropriately eg citric acid cycle in aerobic respiration

(l) Incorrect spelling is given. Sound out the word(s),

- if the correct item 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

(m) Presentation of data:

- if a candidate provides two graphs or bar charts (eg one in the question and another at the end of the booklet), mark both and give the higher score
- if question asks for a line graph and a histogram or bar chart is given, then do not give the mark(s). Credit can be given for labelling the axes correctly, plotting the points, joining the points either with straight lines or curves (best fit rarely used)
- if the x and y data are transposed, then do not give the mark
- if the graph used less than 50% of the axes, then do not give the mark
- if 0 is plotted when no data is given, then do not give the mark (ie candidates should only plot the data given)
- no distinction is made between bar charts and histograms for marking purposes. (For information: bar charts should be used to show discrete features, have descriptions on the x-axis and have separate columns; histograms should be used to show continuous features; have ranges of numbers on the x-axis and have contiguous columns)
- in a pie chart lines must originate from the central point and extend to tick marks. Labels must be given in full.

Marking Instructions for each question

Section 1

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

Section 2

Question			Expected Answer(s)	Max Mark	Additional Guidance
1.	(a)		Selectively permeable/ semi-permeable/ (contains) proteins/ (phospho)lipids/protein channels/ protein carriers	**1**	Not acceptable: porous/pores /protein gates.
	(b)	(i)	Leaf cell: • cell swells/becomes turgid (or suitable description of turgid) Red blood cell: • cell swells/bursts /may burst	**1**	Not acceptable: description of process of osmosis alone.
		(ii)	1.Diffusion/active transport 2. Definition: Diffusion − Movement of molecules/particles from a high to a low concentration. **OR** down the concentration gradient. Active Transport − Movement of molecules/ions from a low to a high concentration. **OR** against/up the concentration gradient.	**1** **1**	To gain this mark the definition must relate to process chosen in part 1. ...across /through a selectively permeable membrane does not negate. Abbreviations of concentration eg conc. only acceptable if the full word is written at least once. Not acceptable: • movement of 'substances' • 'with' the concentration gradient • 'along' the concentration gradient (but this would not negate a correct response). Extra wrong information negates.

Question			Expected Answer(s)	Max Mark	Additional Guidance
2.	(a)	(i)	degradation **(1)** substrate **(1)**	**2**	
		(ii)	**Prediction** - (All or some) lactose would not be removed from the milk /milk would contain lactose/it would not be lactose free **(1)** **Explanation** - Enzyme/lactase denatured **OR** enzyme/active site has changed shape/description of change of shape **(1)**	**2**	Not acceptable: might/may contain lactose/ milk will be the same/milk will be unchanged In the context of this particular question, enzyme destroyed/does not work **will be** acceptable Not acceptable: • enzyme/active site has changed • explanation including reference to above the optimum or above 37˚C
	(b)		Speed up (chemical/biological/biochemical) reactions/allow reactions to occur at lower temperatures/lower the activation energy	**1**	..unchanged in process does not negate. Not acceptable: Control reactions Can break down/build up…
	(c)		Protein/amino acids	**1**	

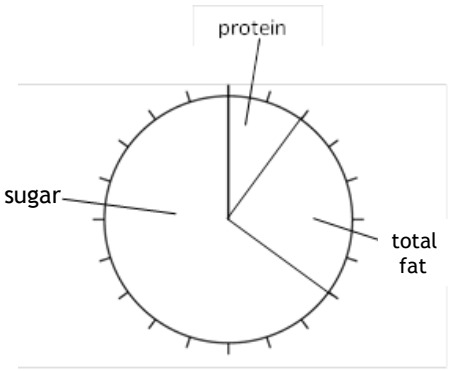
Question			Expected Answer(s)	Max Mark	Additional Guidance
3.	(a)	(i)	Plasmid	**1**	Not acceptable: DNA/chromosome
		(ii)	2	**1**	
	(b)	(i)	To ensure there are no other microbes/bacteria (or equivalent) present **OR** to prevent/stop contamination /cross-contamination/growth of other cultures	**1**	Not acceptable: To ensure nothing affects the growth of bacteria.
		(ii)	Temperature/pH/ 0_2 or $C0_2$ concentration/ nutrient or food levels	**1**	Additional wrong answer would negate eg light.

Question			Expected Answer(s)	Max Mark	Additional Guidance
4.	(a)	(i)	Requires/uses/needs a lot of energy/ATP **AND** for movement/contraction	**1**	Both parts required for mark. Not acceptable: • requires energy • for respiration
		(ii)	Carbon dioxide/Water/(38) ATP	**1**	Not acceptable: Incorrect number of ATP
	(b)		Glucose converted/broken down to pyruvate/pyruvic acid **(1)** Pyruvate/pyruvic acid converted to lactic acid **(1)** (2) ATP produced **(1)**	**3**	1 mark if glucose is original substrate and lactic acid is end product. The addition of CO_2 negates. Arrows are acceptable in place of explanation. Any other number of ATP negates.

Question			Expected Answer(s)	Max Mark	Additional Guidance
5.	(a)	(i)	*Type of blood vessel* vein **(1)** artery **(1)**	**2**	Not acceptable: Specific name of vessel.
		(ii)	They have thinnest/thinner wall(s)	**1**	Answer must be comparative. Any reference to diameter of central channel negates a correct response.
	(b)		Coronary artery/arteries	**1**	

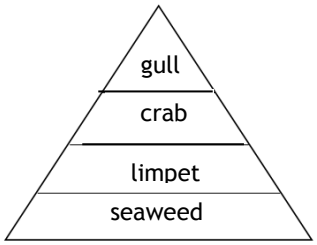
Question			Expected Answer(s)	Max Mark	Additional Guidance
6.	(a)		<table><tr><th>Individual</th><th>Possible Genotype(s)</th><th>Phenotype</th></tr><tr><td>A</td><td>Tt</td><td></td></tr><tr><td>B</td><td></td><td></td></tr><tr><td>C</td><td></td><td>Hitchhiker's (thumb)</td></tr></table> **(1)** **(1)**	**2**	
	(b)	(i)	13:5	**1**	
		(ii)	Fertilisation is a random process **OR** Numbers in sample too small	**1**	

Question			Expected Answer(s)	Max Mark	Additional Guidance
7.	(a)	(i)	Increase in humidity – decreases Increase in temperature – increases Increase in wind speed – increases	**1**	Only one response required.
		(ii)	**humidity** put the apparatus in a (transparent) bag /container **temperature** put a heater beside it/put in a water bath at a higher temperature **wind speed** use a fan/hairdryer on cool setting beside the apparatus	**1**	Accept alternative suitable description. Answer must be appropriate to the selected change. Not acceptable – move apparatus to warmer area/turn up heating/ add a thermometer If hairdryer **must** state that it is on cool setting.
	(b)	(i)	P has a greater number of stomata/ Q has fewer stomata	**1**	Answer must be comparative. Not acceptable: different number of stomata
		(ii)	Guard (cells)	**1**	

Question			Expected Answer(s)	Max Mark	Additional Guidance
8	(a)		Medium (salt)	**1**	
	(b)			**2**	1 mark for divisions 1 mark for labels Mark for labels can be awarded if divisions are wrong but in correct proportions. Additional sections (labelled or not) = 0 marks
	(c)	(i)	80	**1**	
		(ii)	8400	**1**	

Question			Expected Answer(s)	Max Mark	Additional Guidance
9.	(a)		They have receptors/receptor proteins **AND** these are specific/match this hormone.	**1**	Both parts required for mark. Any reference to active site/substrate negates.
	(b)		Endocrine	**1**	Named example not acceptable alone but would not negate the correct response, provided it is clearly stated as an example.
	(c)		Glucagon	**1**	

Question			Expected Answer(s)	Max Mark	Additional Guidance
10.	(a)	(i)	Stickleback	**1**	
		(ii)	Perch	**1**	
	(b)		Heat/movement/ Undigested material/ faeces/excrement/fur/bones/hair	**1**	Not acceptable: Colloquial terms for faeces. Additional incorrect answer would negate eg …and growth.

Question			Expected Answer(s)	Max Mark	Additional Guidance
11.	(a)	(i)	30	**1**	Accept correct answer if not written in table (units not required).
		(ii)		**1**	The addition of correct values would not negate.
	(b)	(i)	Flat (periwinkle) Don't live on/occupy the same position on the shore/ live on different/separate parts of the shore/small live at high tide and flat live at low tide/one lives at low tide and one at high tide	**1**	Not acceptable: • don't live in the same place • they are further or furthest apart/away from each other
		(ii)	They are different species/they are not the same species/more than one species are competing	**1**	The addition of information about resources it must be 'similar'.

Question			Expected Answer(s)	Max Mark	Additional Guidance
12.	(a)	(i)	2	**1**	
		(ii)	**Increased** competition from Meadow grass or appropriate description of the increased competition; eg less space for Ragwort to grow	**1**	Not acceptable: • Meadow grass is increasing/overgrown/ dominant (with no mention or description of competition) • **NO** space for Ragwort to grow
	(b)		Sampling Technique: Pitfall trap **(1)** Source of error: **(1)** Traps left too long/not checked regularly Too high above soil surface/too low below soil surface/not level with soil surface Not camouflaged Too shallow No drainage holes	**2**	Not acceptable: • use of the term 'lid' as it implies it seals the container • description of how to minimise an error If additional explanation given it must match the error. If wrong technique given eg quadrat, the second mark could be awarded for correct source of error for quadrat. If technique left blank or incorrectly named eg trap then the correct error can still be awarded mark.
	(c)		Go to 3 **(1)** Buttercup **(1)** Pink Campion **(1)**	**3**	

Question			Expected Answer(s)	Max Mark	Additional Guidance
13.	(a)		Mutation	**1**	
	(b)	(i)	Different numbers released/marked/captured **OR** to compare results	**1**	Not acceptable: different numbers recaptured.
		(ii)	Fewer were eaten (by predators/birds)/ better camouflaged so not eaten/camouflaged from predators/birds less likely to be eaten/seen by predators or birds/more dark moths eaten by predators or birds	**1**	Must have reference to being eaten or predators/birds. Must be comparative.
		(iii)	Natural selection/survival of the fittest	**1**	'Evolution' not acceptable

Question			Expected Answer(s)	Max Mark	Additional Guidance
14.	(a)	(i)	When predators are present (the number of red spider) mites decrease / there are more (red spider) mites when there is no predator **OR** converse	**1**	Additional correct information would not negate.
		(ii)	To allow it to be compared to the one with the predator/to compare the number of (red spider) mites with and without the predator/to show any difference is due to the predator	**1**	Not acceptable: for comparison.
	(b)		<u>Biological control</u>	**1**	Additional words negate.

[END OF MARKING INSTRUCTIONS]