General Certificate of Education

Biology

Unit 3T AS Investigative Skills Assignment

BIO3T/Q10/MG

Marking Guidelines

2010 examination – June series

Marking Guidelines are prepared by the Principal Moderator and considered, together with the relevant questions, by a panel of subject teachers.

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Guidance for teachers marking Biology ISAs

General principles

In general, you are looking for evidence that the candidate knows and understands the point required by the Marking Guidelines.

It is important to mark what the candidate has written, not to assume what may have been intended. It is also important to make sure that a valid point is in the correct context. Individual words or phrases where the overall answer does not apply to the question asked should not be credited.

Conventions

The following conventions are used in the Marking Guidelines.

- A semicolon (;) separates each marking point
- An oblique stroke (/) separates alternatives within a marking point
- Underlining of a word or phrase means that the term must be used
  For example anaphase, the term must appear
  For example ..... and ....., both items must be present for a mark
- Brackets are used to indicate contexts for which a marking point is valid. This context may be implied by a candidate's answer
- 'Accept' and 'reject' show answers which should be allowed or not allowed.
- Additional instructions are shown in the final column
- 'Max' refers to the maximum mark that can be awarded for a particular question or part question.

The Marking Guidelines show the minimum acceptable answer(s) for each marking point. A better, more detailed, or more advanced answer should always be accepted, provided that it covers the same key point.

Marking Guidelines cannot give every possible alternative wording - equivalent phrasing of answers should be accepted. For example 'the water potential is higher in the cells' is equivalent to 'the water potential is less negative in the cells'. It is, however, important to be sure that the minimum requirement of the Marking Guidelines is met and that the point is made unambiguously.

Converse answers are normally acceptable, unless the wording of the question rules this out. For example, 'the water potential is lower in the solution' is an acceptable converse of 'the water potential is higher in the cell'.

Very occasionally, a candidate will give a biologically correct answer that is not covered in the Marking Guidelines. If it is equivalent in standard to the Marking Guideline answers, it should be credited. In this case, write the word 'valid'.

All marking points are awarded independently, unless a link between points is specified in the Marking Guidelines.

The mechanics of marking

Always mark in red ink. Make sure that some red ink appears on every page on which the candidate has written.

For each mark awarded, put a tick close to the marking point. In all cases, a tick should equal one mark and the total number of ticks should match the mark totals in the margins. The total mark for each part answer should be written in the right hand margin.

Put a cross against incorrect points. It is helpful to indicate omissions of key words or incomplete answers with a Λ symbol, and to highlight irrelevancies or contradictions by underlining. It is also helpful to write brief comments to explain the reason for awarding or withholding a mark when the answer does not obviously match the Marking Guidelines.

When marking answers with many marking points, the points will be numbered. The points do not have to appear in the candidate's response in the order in the Marking Guidelines. The appropriate number must be placed alongside the tick. This helps to clarify where a specific point has been awarded and makes moderation much easier. It also helps to avoid awarding the same point twice.

Disqualifiers A correct point should be disqualified when the candidate contradicts it in the same answer. Indicate this on the script by 'dq'. If a tick has already been placed against a valid point, ensure that it is clearly deleted. Note that there is no penalty for incorrect points which are not contradictory, or for surplus or neutral information.

The list rule When a question asks for a specific number of points, and the candidate gives more, the general rule is that any wrong answer cancels a correct answer. For example, if a question asks for two points and three answers are given, two correct and one clearly wrong, the mark awarded is one, whatever the order of the answers. This prevents candidates from gaining full marks from a list of right and wrong answers.

Answer	Marks	Comment
Oxygen, glucose	2	Both correct
Oxygen, carbon dioxide	1	One correct, one incorrect
Carbon dioxide, oxygen, glucose	1	Carbon dioxide is clearly incorrect and cacels one of the marks
Oxygen, glucose, water	2	Regard water as a neutral point. It is not worth a mark but it is not incorrect

Two or more correct points on the same answer line should be credited.

'Neutral' points, i.e. ones which are not creditworthy but not actually incorrect, should not negate a correct answer.

Spelling Reasonably close phonetic spellings should be credited. However, any misspelling of technical terms which can easily be confused, such as intermediate between 'mitosis' and 'meiosis', should result in the relevant marking point being withheld. Terms like this will be indicated in the final column in the Marking Guidelines to show that misspellings must not be credited.

Stage 1

Assessment of presentation of raw data tables

Candidates should be assessed on their ability to present raw data in an appropriate way.

The following criteria should be used to mark this skill.

Part 1 Making the standards

Marking Guidance	Mark	Comments
Table 1 completely correct;	1	Check that: • volume of beetroot extract plus volume of water totals 5 cm^3 • percentage concentration correct for candidate's volume • values for percentage concentration of extract equally spaced
Total	**1**	

Part 2 The investigation

Marking Guidance	Mark	Comments
Data presented clearly with a full description of both the independent and dependent variable, i.e. alcohol concentration and colour value.	1	This may be recorded either by a full title or by complete headings on the top of the table.
Independent variable (concentration of alcohol) in the first column;	1	
Units clearly stated and only in the heading to the appropriate columns:	1	e.g. % (of alcohol), arbitrary units or % of extract (colour value)
Total	**3**	

The data tables are required for moderation and must be attached to the ISA written test.

Stage 2

Assessment of processing

Marking Guidance	Mark	Comments
Graph has independent variable (concentration of alcohol) on x axis and dependent variable (colour value or concentration of extract) on y axis;	1	
Both axes correctly labelled with appropriate units i.e. alcohol / %, colour value / arbitrary units or % of extract	1	Accept % alcohol
Appropriate scales selected for the x and y axes;	1	These scales should allow for both accurate plotting and reading of the graph
All points plotted accurately;	1	If ICT has been used to plot the graph, it should be possible to read the points with appropriate precision
Data presented as a line graph;		Depending on the data obtained by the student: • points should be joined with a curve of best fit if it is felt that intermediate values are likely to fall on such a curve • alternatively, all points should be joined with straight lines if it is felt that the position of intermediate points cannot be predicted reliably. • no marks should be awarded if the curve is extrapolated beyond the range of data collected.
Total	**5**	

The graph produced is required for moderation and must be attached to the ISA written test.

SECTION A

Question		Marking Guidance	Mark	Comments
1		To wash off any pigment / betalins (on the discs); To show that any pigment released is from the effect of alcohol;	1 max	
2	(a)	(Distilled) water and (two) discs of beetroot;	1	
2	(b)	To show that the alcohol was causing the leakage of pigment / to compare it with the effects of the alcohol;	1	
3	(a)	Increase the contact of all surfaces with the alcohol / prevent discs sticking together / maintain a diffusion gradient for the pigment;	1	
3	(b)	To limit the variation in time discs are in alcohol / make sure all the discs were in contact with alcohol for the same length of time / so no more pigment can diffuse out of the discs;	1	Accept fair test if qualified by relevant marking point
4		Heating / cooking would damage the (plasma) membranes; Valid explanation of damage e.g. disrupts phospholipid bilayer / denatures proteins; A lot of pigment released during cooking / less pigment present (in tissue);	2 max	Do not accept reference to killing membrane
5		Less kinetic energy; Molecules move slower; Lower rate of diffusion; Membranes less fluid;	2 max	

Question		Marking Guidance	Mark	Comments
6		Variation in beetroot / variation in judging colour;	1	Credit any valid variation
7	(a)	No (no mark) Curve drawn on graph should not extend beyond data collected / no control carried out with water;	1	
7	(b)	Phospholipids are in the membranes; Membrane breaks down faster / more at higher concentration of alcohol / (higher concentration of alcohol) increases the permeability of membranes; More betalins / pigments move out of cells / vacuoles; (Allows) faster rate of diffusion of pigment;	3 max	
8	(a)	Repeat experiment at 100 % alcohol concentration; Check to see if results are concordant / similar;	2	
8	(b)	Concentration of pigment inside and outside of the tissue reached equilibrium / an equal concentration of pigment inside and outside the beetroot / pigment diffusing in and out at the same rate; Maximum membrane damage;	1 max	Do not accept **all** pigment has diffused out
		Total marks for Section A	**17**	

Section B

Question		Marking Guidance	Mark	Comments
9		Fatty acids used to make phospholipids; Phospholipids in membranes; More phospholipids more membranes made; Fatty acids respired to release energy; More triglycerides more energy released; Energy used for cell production / production of named cell component;	2 max 2 max	Do not allow credit for 'making' energy
10		(Omega-3 concentration) falls more rapidly at first; Levels out at 140 days / concentration of 0.4%;	2	

Question		Marking Guidance	Mark	Comments
11	(a)	Two marks for correct answer of 0.04 or 0.043;; One mark for incorrect answer which clearly identifies total fall of 1.7;	2	
11	(b)	To take into account variation in fat content of milk / fat content varies from cow to cow; Allows comparison;	2	
11	(c)	The graph shows a decrease with time feeding on corn; No control group; Might have fallen anyway / might decrease with time rather than with time spend feeding on corn; Other factors / other named factor might also have changed; Only one investigation so might not be representative;	4 max	
12		Standard deviation shows there is overlap of the 2 data sets; Small sample of wild salmon so may not be representative of population;	2	
13		The different diet of the fish; Omega-3 fatty acids used in respiration / as a source of energy; Wild trout are more active / use more energy;	2 max	
		Total marks for Section B	**18**	