General Certificate of Education

Biology

Unit 3T AS Investigative Skills Assignment

BIO3T/Q11/MG

Final Marking Guidelines

2011 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

Final Marking Guidelines must be used to mark candidates' work

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.

Name **two** substances that are produced in photosynthesis. *(2 marks)*

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 cancels 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 Marking Guidelines to show that misspellings must not be credited.

Stage 1

Data must be recorded as raw data not as tallies. If only tallies are recorded, only the mark for sample size can be given for the table.

Marking Guidance	Mark	Comments
Candidate's raw data presented clearly with full descriptions of measurements made and of the environmental variable. E.g. 'length of ivy leaves on south-facing and north-facing wall'	1	This may be recorded either by a full title or by complete headings on the top of the table (e.g. if 'length' only recorded in the table, the title should give more detail by reference to ivy leaves and site.)
Units stated clearly and only in the heading to the appropriate columns;	1	Although AQA uses the IOB convention of separating units by a solidus(/), credit should not be awarded or withheld for the way in which units are presented, provided they are clear.
Sample size of 15 or more;	1	
Total	**3**	

Stage 2

Marking Guidance	Mark	Comments
Mean values of both samples calculated correctly;	1	
Standard deviations of both samples calculated correctly;	1	
Frequency tables correctly constructed;	1	Suitable class intervals chosen of equal size.
Graph has length of leaves on x-axis and frequency or number of leaves on y-axis;	1	
Appropriate scale selected for y-axis;	1	This scale should allow for both accurate plotting and reading the graph.
x axis correctly labelled with appropriate units;	1	Although AQA uses the IOB convention of separating units by a solidus(/), credit should not be awarded or withheld for the way in which units are presented, provided they are clear.
All bars plotted accurately. If ICT has been used, it should be possible to read the height of the bars with appropriate precision;	1	
Data presented as a histogram with bars touching;	1	
Both sets of data plotted so comparison can be made;	1	e.g. two separate histograms above one another with same size class intervals or two histograms on separate sheets with same size class intervals and drawn to same scale as x and y axes.
Total	**9**	

Question	Marking Guidance	Mark	Comments
1	Either 1 For light intensity 2 Light meter; or 3 For trampling 4 Number of people who walked on the site in a set period of time / force required to push a prode into the ground;	1 max	4 Accept other approaches if they provide quantitative information E.g. Distance from path.
2	Answer will depend on investigation carried out Variable; Explanation;	2	Eg Accept any biotic or abiotic factor temperature, pH, light intensity, trampling, insects feeding. Accept affecting any process that could be associated with leaf size. E.g. photosynthesis, growth, respiration, damage to leaf.
3	1 Make sure the sample was representative; 2 Produce a reliable mean; 3 Reduce the effect of extreme values / reduce the effect of anomalies / identify anomalies;	2 max	Accept 'carry out a statistical test' Do not accept 'make sure sample was reliable / precise / accurate.
4	To avoid bias;	1	Accept explanation e.g. so that particular leaves were not chosen.
5	Give measure of spread of variation in data;	1	Do not accept 'Give range of data'.

Question	Marking Guidance	Mark	Comments
6 (a)	37;	1	
6 (b)	No (no mark) Could be explained by natural variation/procedure carried out in same way each time;	1	Accept explanation using values e.g. no more different than 33 / 40 than 73 and 66.
6 (c)	No (no mark) Still possible to calculate mean/standard deviation;	1	
6 (d)	Leaves vary in shape / are also different in length/thickness;	1	
	Total marks for Section A	**11**	

Section B

Question	Marking Guidance	Mark	Comments
7	Banding pattern changes as cheetah gets older / difficult to judge as tail is short/fluffy;	1	
8 (a)	1 Mean not (always) a whole number; 2 Standard deviation not (always) zero;	2	
8 (b)	Movement of tail/angle of sight/confused it with another band / subjective estimation;	1	Accept reference to **Figure 1** E.g. Bands 2 and 3 have same thickness but look different
9	Band width not the same on both sides of tail;	1	
10	1 Offspring of the same family will be more similar genetically; 2 As have same mother (and father) / parent; 3 Expect to see more differences in randomly chosen cheetahs;	3	
11 (a)	To show whether immune response occured / because cats are (genetically) related to cheetahs;	1	Ignore reference to control.
11 (b)	To show that rejection did not normally occur/skin could (successfully) be grafted;	1	

Question	Marking Guidance	Mark	Comments
12 (a)	1 Rapid rejection between unrelated (domestic) cats / cats are not genetically similar; 2 Rapid rejection between (domestic) cat and cheetah / cats and cheetahs are **not** genetically similar; 3 Slow / no rejection in cheetahs / cheetahs are genetically similar;	3	
12 (b)	1 Sample size small; 2 Time observed was short;	1 max	
12 (c)	Similar (antigens on all cheetahs);	1	Accept same / not very different
12 (d)	1 Protein/antigen production determined by alleles/genes/base sequence on DNA; 2 The more similar the proteins the more similar their alleles / genes / base sequence on DNA / the more they are genetically similar;	2	
13 (a)	1 Drop in numbers; 2 Small variety of alleles / small gene pool (in remaining organisms) than in original population;	2	Allow small number of different alleles Reject small number of alleles
13 (b)	1 Less likely to be able to adapt to a change in the environment; 2 Lower breeding success; 3 All susceptible to same diseases; 4 More genetic abnormalities;	2 max	
	Total marks for Section B	**21**	