



General Certificate of Education (A-level)
June 2012

Biology

BIO6T/Q12

(Specification 2410)

Unit 6T: Investigative Skills Assignment.

FINAL

Marking Guidelines

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 students' work and these will be published on eAQA in October.

General principles

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

It is important to mark what the student 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 student'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 student 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 student 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 \wedge 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 student'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 student 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 student 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 students 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 final column in the Marking Guidelines to show that misspellings must not be credited.

BIO6T/Q12 TASK

Before you mark any work, please make sure that you have read **Guidance for teachers marking Biology ISAs** on pages 3 and 4 of these Marking Guidelines.

Stage 1

The table of raw data collected during implementation is required for moderation and must be attached to the ISA test.

(NB no marks are awarded for the table, Stage 1, at A2)

Stage 2 - Assessment of statistical analysis

Question	Marking guidance	Mark	Comments
1	Clear statement of null hypothesis;	1	e.g. temperature has no effect on respiration in yeast / any difference in the rate of respiration of yeast at different temperatures is due to chance.
2(a)	Standard error (and 95% confidence limits);	1	Accept answers such as "Standard error" that clearly identify the test concerned from the statistics sheet. Reject: Standard Deviation
2(b)	Comparing means;	1	
3	Test statistic calculated correctly;	1	
4	1 Probability greater than 0.05 / 5% that results are due to chance; 2 Accept null hypothesis; OR 1 Probability less than 0.05 / 5% that results are due to chance; 2 Reject null hypothesis;	2	Use student's value of test statistic even if it has been calculated incorrectly. 1 Must refer to both probability <u>and</u> chance.
		Total 6	

The Candidate Results Sheet: Stage 2 is required for moderation and must be attached to the ISA test.

BIO6T/Q12 - Section A

Question	Marking Guidance	Mark	Comments
5	To equilibrate / so the tubes reach the required temperature / so the yeast reaches the required temperature;	1	Do not allow “same temperature” alone Accept 35°C or temperature of the water bath instead of required temperature.
6	1 Use thermometer to measure throughout investigation; 2 Heat / remove Bunsen burner / add cold / hot water;	2	1 To gain mark, there must be a reference to measuring the temperature on more than one occasion.
7	1 Methylene blue and glucose / methylene blue, boiled yeast and glucose; 2 To show that glucose did not cause methylene blue to go colourless / to show that the colour change was produced by respiration/yeast;	2	1 Do not accept water as alternative to yeast/glucose. 2 Do not accept clear as alternative to changing colour.
8	1 Mixing with air / oxygen; 2 (Oxygen) oxidises methylene blue / causes methylene blue to give up electrons;	2	
9	1 Methylene blue accepts electrons; 2 (Electrons) from glucose / substrate / intermediate / reduced coenzyme;	2	
10(a)	1 As temperature increases the rate of respiration increases then decreases; 2 Fastest / optimum at 40°C;	2	Note that graph shows time taken, not rate. Question demands reference to rate.
10(b)	1 Respiration faster / more electrons (released); 2 (More) kinetic energy; 3 (More) collisions / (more) enzyme substrate complexes formed; 4 Less time for / faster decolourisation (of methylene blue);	3 max	
Total marks for Section A		14	

BIO6T/Q12 - Section B

Question	Marking Guidance	Mark	Comments
11	1 Carbohydrate/sugar/named carbohydrate; 2 Minerals / named mineral ion; 3 Amino acids/protein; 4 Vitamins;	2 max	2 Accept alternatives for mineral such as inorganic substances / ions. Accept symbol for ion. Accept incorrect symbols providing that answers are not ambiguous.
12	1 Shake/stir/mix; 2 Even distribution of yeast/cells;	2	Accept other terms with a similar meaning for both points
13	Two marks for correct answer of 20 / 20.2 / 20.22;; One mark for incorrect answer in which student clearly shows increase as 8.912 – 7.413 or as 1.499;	2	Ignore references to 10 ⁶
14	1 More competition; 2 Less oxygen; 3 Less glucose/sugar/carbohydrate /respiratory substrate; 4 Ethanol/alcohol becomes toxic / inhibits respiration / inhibits reproduction; 5 Fall in pH;	2 max	
15	1 No oxygen can enter; 2 Ethanol produced during anaerobic respiration; OR 3 No ethanol/carbon dioxide can escape; 4 Allows accuracy of measuring; OR 5 To prevent entry of / contamination with microorganisms; 6 Prevent competition with yeast;	4 max	Any two pairs of answers Second mark of each pair must be related to the first point of the pair.
16	1 Yeast respiring aerobically; 2 Oxygen used equal to carbon dioxide produced;	2	

17	1 7.0 / 7; 2 Ethanol production starts;	2	
18(a)	1 Repeat; 2 Identify anomalies / see if results are similar / enough results for statistical test / give more reliable mean; 3 Carry out statistical test / statistical analysis; 4 Ensure results are significant / find probability of results being due to chance; 5 Peer review; 6 Allows procedure to be checked / see if other scientists get similar results;	4	Two pairs of linked points, each pair a suggestion and an explanation. The explanation must relate to the suggestion to gain the second point of the pair.
18(b)	1 Curve levelling off / rate of increase is decreasing/very little extra ethanol produced; 2 Becomes less cost effective / less profit;	2	2 Accept a description of cost effectiveness
18(c)	1 (Funding agency) might want particular results; 2 Results may be withheld / results may not be published / results may be confidential;	2 max	
Total marks for Section B		24	