General Certificate of Education

Biology

Unit 6T A2 Investigative Skills Assignment

BIO6T/P11/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

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 final column in the Marking Guidelines to show that misspellings must not be credited.

Stage 2 (NB no marks are awarded for Stage 1 at A2)

Question	Marking Guidance	Mark	Comments
1	Clear statement of null hypothesis;	1	e.g. ammonium hydroxide has no effect on the time taken for colour change
2 (a)	Standard error (and 95% confidence limits);	1	
2 (b)	Compare two means;	1	Do not credit if wrong test is chosen
3	Test statistic calculated accurately;	1	Accept candidate's accurate calculation even if the test is not appropriate. If working not shown, calculcation must be checked against raw data.
4	1 Correct interpretation of statistical test in terms of acceptance or rejection of null hypothesis; 2 Interpretation involves appropriate reference to the probability of the results being due to chance;	2	Use candidate's value from chosen test, even if it is incorrect Probability and chance must be used in the correct context
	Total	**6**	

The table of raw data and the Stage 2 sheet is required for moderation and must be attached to the ISA test.

ISA test Section A

Question	Marking Guidance	Mark	Comments
5 (a)	Few/no chloroplasts present / tough material so will not be cut up (by blender);	1	
5 (b)	Break open cells / break cell walls / allow release of chloroplasts;	1	
6 (a)	EITHER 1 Slows/stops enzyme activity; 2 Enzymes released during blending; 3 Chloroplasts not damaged/still function/photosynthesis continues; OR: 4 Blending produces friction/releases heat; 5 (Heat) changes the tertiary structure (of enzymes) / denatures enzymes; 6 Chloroplasts not damaged / still function / photosynthesis continues;	3	Do not credit references to microorganisms/bacteria/decay Allow answers via *one* route only
6 (b)	1 Same water potential (as plant tissue) / no osmosis/no water movement in/no water movement out; 2 Chloroplasts/organelles do not burst / chloroplasts do not shrivel / chloroplasts are not damaged;	2	Accept 'no osmosis in or out' Accept 'no water movement in or out' Answer to second point must follow from first Reject cells do not burst
7	1 Filter/centrifuge; 2 At low speed then high speed / centrifuge again at higher speed / filter then centrifuge; 3 Collect pellet/sediment;	3	Marking principles are: 1. Filtering or centrifuging 2. Carrying out procedure twice at different speeds 3. Pellet is required

Question	Marking Guidance	Mark	Comments
8	Prevent entry of light/keep in the dark / to slow release of electrons from chlorophyll / because release of electrons / photosynthesis only occurs in the light /to stop photosynthesis;	1	
9	1 Shows that colour change in **x** / colour does not change in **B**; 2 (Colour change) not due to isolation medium; 3 (Colour change) is due to chloroplasts / chlorophyll;	2 max	Accept shows that mitochondria do not affect result.
10	Chloroplast membrane;	1	Accept grana or thylakoids
11	1 Ammonium hydroxide has stopped/slowed transfer of electrons; 2 Along electron transport chain/to DCPIP; OR 3 Ammonium hydroxide accepts electrons; 4 Does not pass along electron transport chain / to DCPIP; OR 5 Ammonium hydroxide affects pH; 6 pH affects proteins in electron transport chain;	2	Accept equivalent terms for electron transport chain Do not accept 'from chlorophyll'. This is insufficient Reject enzymes.
12 (a)	1 Stop/slow light-dependent reaction; 2 Stop/less production of reduced NADP/ATP; 3 Light-independent reaction slowed/stopped / photosynthesis slower/not completed;	2 max	Must refer to reduced NADP or alternatives for reduced NADP Slows or stops light-dependent reaction and light-independent reaction gain 2 marks
12 (b)	1 (Substance in weed killer) absorbed by crop; 2 Reduce growth/yield of crop / weed killer not selective; 3 Toxic effects on other wild life/when crop eaten; 4 Slows/stops respiration;	2 max	1 Idea of uptake 2 Idea of effect of uptake e.g. builds up in food chain and toxic / poisonous/harmful to other organisms
	Total	**20**	

Section B

Question	Marking Guidance	Mark	Comments
13	Two marks for correct answer, 41.9 / 42 ;; One mark for incorrect answer of 0.42;	2	
14	Increases proportion of crop that is used / greater proportion is grain / reduces proportion of crop that is not used / is not grain;	1	
15	1 Quadrats from different parts of field; 1 Biotic / abiotic factors / named biotic /abiotic factor different;	2	
16	1 Water (in plants and grain); 2 Varies;	2	
17	1 Greater when treated with herbicide **G**; 2 Same number but total biomass larger;	2	Can be shown by figures
18	1 Fewer weeds left; 2 Fewer weeds to produce seeds; 3 Less contamination of crop (by weeds); 4 Fewer weeds to separate from crop; 5 Less competition (between crop and weeds);	2 max	

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Question	Marking Guidance	Mark	Comments
19	**Advantage** 1 Weeds growing fast / photosynthesising fast so effect will be seen / will have large effect; **Disadvantage** 2 No information about winter / other seasons / weeds not growing fast / could kill (beneficial) insects / crop may be harvested before effects noticeable;	2	One mark for advantage and one mark for disadvantage
20	**Limitations of investigation** 1. No control/untreated field; 2. Amount of herbicide may be different; 3. May be differences between fields; Eg soil Nutrients/fertiliser added Type of weed Microclimates 4. May be different number of weeds (at start); **Limitations of results** 5. No replicates/one set of data; 6. Field size may vary/not specified; **Scientific Research** 7. Scientific research/example of scientific research has led to greater yield;	5 max	When marking please number the marking points e.g. $\overset{5}{\checkmark}$ means a mark award for point 5
	Total	**18**	