

# Mark Scheme – Results

January 2014

International Advanced Level Biology  
(WBI03) Paper 01

Unit 3: Prac.Biol.& Research(Wa)

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:
  - i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear
  - ii) select and use a form and style of writing appropriate to purpose and to complex subject matter
  - iii) organise information clearly and coherently, using specialist vocabulary when appropriate

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	1. Time ;	Allow any answer that refers to time	(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	<ol style="list-style-type: none"> <li>1. Idea that samples of the liquid (around the discs) were removed / eq ;</li> <li>2. Idea that intensity of colour needs to be measured ;</li> <li>3. idea of quantifying the colour e.g. absorbance, transmission, comparison against standard ;</li> <li>4. method of quantifying colour described e.g. colorimetry ;</li> </ol>	<ol style="list-style-type: none"> <li>1. e.g. a sample of solution</li> <li>2. allow amount of on this occasion</li> <li>4. ACCEPT minor spelling errors for this, (colorimeter is OK)</li> </ol>	(3)

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	<ol style="list-style-type: none"><li>any one stated temperature between 10 and 50 °C ;</li><li>idea that temperature can affect {permeability of the membrane / rate of leakage / eq} / eq ;</li></ol>	<ol style="list-style-type: none"><li>ALLOW room temp if qualified e.g. 37 °C units needed IGNORE a stated range</li></ol>	(2)

Question Number	Answer	Additional Guidance	Mark
1(a)(iv)	<ol style="list-style-type: none"><li>idea of no fenitrothion / with just water ;</li><li>idea of using the same set up / eq ;</li></ol>		(2)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	<p>A axes correct (x – time from start, y – colour) ;</p> <p>L axes correctly labeled, and with units (h / hours and au / arbitrary units) ;</p> <p>P correct plotting ;<sup>Ⓔ</sup></p> <p>S ruled line along x-axis to 2.0, then rising ;</p>	<p>Bar chart max. 3</p> <p>S NOT freehand line ruled line can be point to point or line of best fit NOT if extrapolated beyond 6 hours</p>	(4)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	<p>1. idea of repetition e.g. more sets of twenty discs ;</p> <p>2. (calculation of) mean / eq ;</p> <p>3. reference to use of {error / range / SD / eq} bars ;</p> <p>4. idea of dealing with anomalous data ;</p>	<p>1. NOT if any parameter changed e.g. different concentration IGNORE references to accurate etc.</p> <p>2. ACCEPT average</p>	(3)

Question Number	Answer	Additional Guidance	Mark
1(c)	<p>Similarity: both show increase with time / eq ;</p> <p>Difference:idea that mineral ions start to leak straight away, {colour / pigment / betalain} does not / eq ;</p>	Difference ACCEPT idea of colour staying constant for part of the time / at beginning, minerals not	(2)

Question Number	Answer	Additional Guidance	Mark
1(d)	<ol style="list-style-type: none"> <li>1. idea that it affects the structure of cell membranes ;</li> <li>2. (fenitrothion) {increases / eq} the {permeability / eq} of membranes / eq ;</li> <li>3. idea that cell surface membrane is affected before vacuole membrane ;</li> <li>4. idea that for mineral ions to leak only the cell surface membrane needs to be damaged ;</li> <li>5. idea that for betalain leakage both cell surface membrane and the vacuole membrane would need to be damaged ;</li> </ol>	2. ALLOW makes the membranes permeable	(3)

Question Number	Answer	Additional Guidance	Mark
2(a)	1. idea of elephants damaging crops ;	ALLOW farms	(1)

Question Number	Answer	Additional Guidance	Mark
2(b)	1. a graph that compares farms with fences with those without ; 2. clear comparison of number elephants and incidents in both types of farm e.g. use of a key or labelled axes ;	1. can be for number of elephants or incidents or both 2. should see four bars but can be two graphs	(2)

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	1. bee fence is cheap / eq ; 2. speaker system would {be expensive / needs electricity /eq} ; 3. income to farmer from honey / eq ; 4. chilli and engine oil mix is cheap / eq ; 5. idea of loss of crops ;		(2)

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	<ol style="list-style-type: none"> <li>1. idea of pollination ;</li> <li>2. idea that elephants less likely to be harmed ;</li> <li>3. idea of bees as food source for predators ;</li> <li>4. idea of honey as food for other organisms ;</li> </ol>	IGNORE benefits to humans	(2)

Question Number	Answer	Additional Guidance	Mark
2(c)(iii)	<ol style="list-style-type: none"> <li>1. idea of {bee stings / venom} ;</li> <li>2. idea of risk of anaphylactic shock / allergic reaction ;</li> </ol>	2. ACCEPT death	(2)

Question Number	Answer	Additional Guidance	Mark
2(d)	<ol style="list-style-type: none"> <li>1. reduces number of incidents of crop damage / eq ;</li> <li>2. reduces number of elephants involved / eq ;</li> <li>3. suitable data manipulation to support the answer ;</li> </ol>	<p>all in the context of the presence of fences</p> <p>3. for MP1 6 fewer / 46% less / 1.9x fewer For Mp2 57 fewer / 60% less / 2.5x fewer</p>	(3)

Question Number	Answer	Additional Guidance	Mark
2(e)	<ol style="list-style-type: none"> <li>1. sound trial was replicated / eq ;</li> <li>2. so more reliable / eq ;</li> <li>3. farm trial was not replicated / eq ;</li> <li>4. so less reliable ;</li> <li>5. reference to the use of controls / eq ;</li> <li>6. so valid ;</li> <li>7. similar results for the effect of bees in both studies / eq ;</li> <li>8. related to validity ;</li> </ol>	1. ALLOW sound trial used lots of elephant families	(4)

Question Number	Answer	Additional Guidance	Mark
2(f)	<ol style="list-style-type: none"><li>1. para. 9 ;</li><li>2. reinforces the point that fences cheap ;</li><li>3. para. 12 ;</li><li>4. idea that cost of fence can be offset by profit from sale of honey ;</li></ol>		(4)

