

# Mark Scheme (Results)

January 2016

Pearson Edexcel International  
Advanced Level  
in Biology (WBI03)  
Paper 01 - Practical Biology and  
Research Skills

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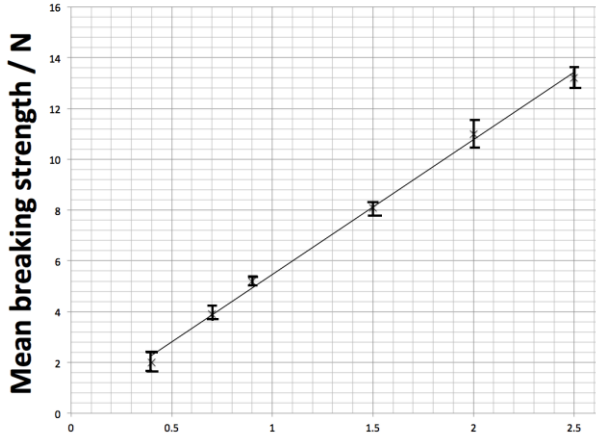
## General Marking Guidance

- This mark scheme provides a list of acceptable answers for this paper. Candidates will receive credit for all correct responses but will be penalised if they give more than one answer where only one is required (e.g. putting an additional cross in a set of boxes). If a candidate produces more written answers than the required number (two instead of one, three instead of two etc), only the first answers will be accepted. Free responses are marked for the effective communication of the correct answer rather than for quality of language but it is possible that, on some occasions, the quality of English or poor presentation can impede communication and lose candidate marks. It is sometimes possible for a candidate to produce a written response that does not feature in the mark scheme but which is nevertheless correct. If this were to occur, an examiner would, of course, give full credit to that answer.
- 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.

Question Number	Answer	Additional Guidance	Mark
Q01(a)(i)	breaking strength / eq ;	<b>IGNORE</b> "force" unqualified <b>ACCEPT</b> "force needed to break (the stem)" <b>OR</b> "breaking force"	<b>1</b>
Question Number	Answer	Additional Guidance	Mark
Q01(a)(ii)	1. measure diameter with {callipers / vernier callipers / micrometer (screw gauge)} ;  2. quote area of a circle formula ;	<b>ACCEPT</b> {microscope stage micrometer / eq} if measuring a section <b>IGNORE</b> use of ruler  <b>ACCEPT</b> $\pi r^2 / \pi(d \div 2)^2 / \pi d^2 \div 4$	<b>2</b>
Question Number	Answer	Additional Guidance	Mark
Q01(a)(iii)	1. Ref to acclimatise / equilibrate / or described;  2. suitable example of acclimatisation procedure described ;	(kept): at same/ sensible temperature {room/5-35°C} / ( in (lake) water / at same humidity / in aerated water  <b>NB</b> any ref to retting or rotting / eq negates marks	<b>2</b>

Question Number	Answer	Additional Guidance	Mark
Q01(a)(iv)	1. temperature ;  2. thermostatically controlled {room / chamber / incubator} / air conditioning ;  3. humidity ;  4. air conditioning / description of how humidity is controlled ;	<b>IGNORE</b> water bath  <b>ACCEPT</b> {incubator/ eq} set at a stated temperature, unless unreasonable (NOT oven)   e.g. beaker of water in sealed chamber	<b>2</b>

Question Number	Answer	Additional Guidance	Mark
Q01(a)(v)	1. risk of falling in lake with sensible precaution ;  2. risk of {contamination / poisoning / allergy / spines / stings} prevented by use of gloves / hand washing / mask ;  3. ref breaking stem / spring on meter so use of goggles ;	<b>ACCEPT</b> tie rope around waist and {post / tree trunk}, life jacket	<b>3</b>

Question Number	Answer	Additional Guidance	Mark
Q01(b)(i)	<p>A linear scale using half of graph paper ;</p> <p>L suitable line of best fit ;</p> <p>P correct plotting ;</p> <p>S SDs plotted suitably ;</p>	<p>Sample Graph</p>  <p>Mean breaking strength / N</p> <p>Stem cross-sectional area / m<sup>2</sup> x 10<sup>-6</sup></p> <p>L Do not award if extrapolated, freehand line or dot to dot</p> <p>S Must be bars around plotted mean of same length above and below</p>	<p><b>4</b></p>

Question Number	Answer	Additional Guidance	Mark
Q01(b)(ii)	they are (directly) proportional / positive correlation / eq ;	<b>ACCEPT</b> description of relationship e.g. "as area increases breaking force increases"	<b>1</b>
Question Number	Answer	Additional Guidance	Mark
Q01(b)(iii)	1. SDs / error bars do not overlap ;  2. so {confidence is high / difference is significant / real / conclusion is valid} / eq ;	<b>IGNORE</b> SDs small <b>ACCEPT</b> range / range bars  <b>NOT</b> results or experiment valid	<b>2</b>
Question Number	Answer	Additional Guidance	Mark
Q01(c)	1. both show positive correlation / eq ;  2. bladderwort goes up to {63 /56} N, <i>Elodea</i> only 13.1 N ;  3. (between 2 and 2.5 m <sup>2</sup> x 10 <sup>-6</sup> ) both about the same breaking strength / bladderwort stronger ;  4. credit quantitative comparison ;	<b>ACCEPT</b> relationship same       e.g. "bladderwort 1.1 N stronger than <i>Elodea</i> at 2 m <sup>2</sup> x 10 <sup>-6</sup> " gains mps 3 and 4	<b>3</b>

Question Number	Answer	Additional Guidance	Mark
Q02(a)	{diseases / eq} caused by (contact) lenses ;	e.g. "infections caused by wearing contact lenses"	<b>1</b>

Question Number	Answer	Additional Guidance	Mark
Q02(b)	<p>1. table with suitable headings ;</p> <p>2. showing correct percentages ;;</p>	<p>Two columns, "percentage of cases (of keratitis)" or "cases (of keratitis) %" <i>and</i> "group of pathogens" or "causative agent" or "pathogen"</p> <p>62.64 / 62.6 / 63</p> <p>35.85 / 35.84 / 35.8 / 35.9 / 36</p> <p>1.51 / 1.5 / 2</p> <p>2 marks for all 3 correct, 1 mark for 2 correct.</p> <p>If candidate draws bar chart or pie chart, award the marks for mp2 if the percentages shown clearly</p>	<b>3</b>



Question Number	Answer	Additional Guidance	Mark
Q02(b)(ii)	<p>1. all 6 elements present with no extras ;</p> <p>2. order correct ;</p> <p>3. authors names abbreviated ;</p>	<p>i.e. names, date, article title, journal, volume number and pages do not award if "volume", "pages", "pp" are included <b>IGNORE</b> "...by"</p> <p>as above, there should be a minimum of 4 elements to judge this</p> <p>e.g Moriyama, A.S., Hofling-Lima, A. L. <b>OR</b> Aline, S.M., Anna, L.H-L. <b>ACCEPT</b> just one initial in any case <b>ACCEPT</b> either author with "et al"</p> <p>3 marks for Moriyama, A. S. and Hofling-Lima, A. L. (2008) Contact Lens-associated microbial keratitis, <i>Arquivos Brasileiros de Oftalmologia</i>, <u>71</u>, 32-36</p>	<b>3</b>

Question Number	Answer	Additional Guidance	Mark
Q02(c)	<ol style="list-style-type: none"> <li>1. wash hands (before touching lenses) ;</li> <li>2. replace lenses correctly ;</li> </ol>	<b>ACCEPT</b> in either order	<b>2</b>

Question Number	Answer	Additional Guidance	Mark
Q02(d)	<ol style="list-style-type: none"> <li>1. saving money by keeping lenses longer ;</li> <li>2. creation of jobs ;</li> <li>3. reduced burden on health care budget ;</li> <li>4. less money spent on cleaning fluids ;</li> <li>5. higher initial costs because of complicated procedure to make lenses ;</li> </ol>	Must be reference to economics in all cases	<b>3</b>

<b>Question Number</b>	<b>Answer</b>	<b>Additional Guidance</b>	<b>Mark</b>
<b>Q02(e)(i)</b>	1. immobilised proteins reduce quality of lens ; 2. some of the surface may not be treated so increased chance of infection ; 3. new type of lens could cause {damage to / inflammation of} eye ; 4. no single protein yet found which is suitable ;		<b>3</b>
<b>Question Number</b>	<b>Answer</b>	<b>Additional Guidance</b>	<b>Mark</b>
<b>Q02(e)(ii)</b>	1. immobilised protein ;		<b>1</b>
<b>Question Number</b>	<b>Answer</b>	<b>Additional Guidance</b>	<b>Mark</b>
<b>Q02(e)(iii)</b>	1. PEG, which reduces attract between the (lens) surface and proteins ; 2. Fimbrilides , which decrease bacterial adhesion / eq ;	ACCEPT "immobilised protein, prevents build-up of biofilm" as ecf if not used in 2eii	<b>2</b>

Question Number	Answer	Additional Guidance	Mark
Q02(f)	1. reduction in waste ; 2. reduced use of {lenses / cleaning fluids} ; 3. leads to less {landfill / pollution / fossil fuel use} ;		<b>2</b>

