



Pearson

# Mark Scheme (Results)

January 2017

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

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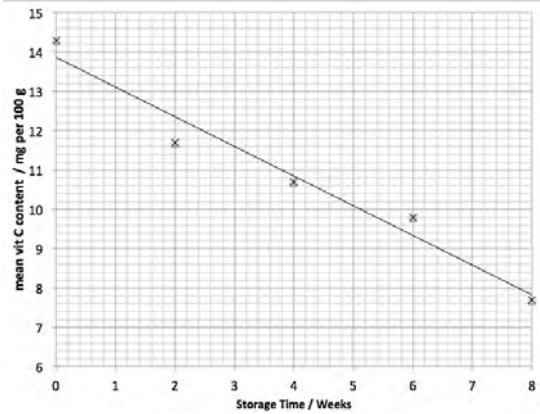
## General Marking Guidance

- 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.

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	1. (storage) time / eq ;	ACCEPT jam making process IGNORE storage time of { fruit / pineapple }	(1)(grad)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	<p>1. age / ripeness of fruit ; 2. choose same age / ripeness / eq ;</p> <p>OR</p> <p>3. temperature/ time of heating pineapple ; 4. heat for {same / stated} time / at {same / constant / stated} temperature ;</p> <p>OR</p> <p>5. mass of sugar added ; 6. use {same / stated} mass ;</p>	<p>Allow how variable controlled even if on variable line, e.g. <b>“mass of sugar added should be 50g”</b>. This gains mps 5 and 6.</p> <p>MP3 DO NOT CREDIT temperature of storage MP4 IGNORE if storage of {fruit / jam}</p>	(2)(grad)

	Answer	Additional Guidance	Mark
1(a)(iii)	<ol style="list-style-type: none"><li>1. take {equal / stated} {mass / volume} samples (of the jam from each container) ;</li><li>2. mix with water ;</li><li>3. of {equal / stated} volume (for each sample) ;</li><li>4. {stir /eq} for {equal / stated} time ;</li><li>5. filter / eq ;</li></ol>		(3)(expert)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	<p>A axes right way round and linear (x storage time , y- mean vit C content) ;</p> <p>L axes correctly labelled, and with units, (x), weeks and (y), {mg 100 g<sup>-1</sup> / mg per 100 g} ;</p> <p>P correct plotting ;</p> <p>S reasonable line of best fit drawn ;</p>	<p>DO NOT ACCEPT if extrapolated beyond 8 weeks</p> 	(4)(expert)

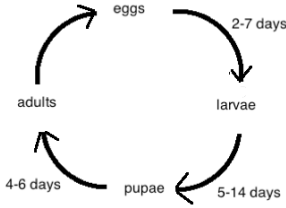
Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	1. choose end points 14.3 and 7.7 ONLY ; 2. correct sum $\{14.3 - 7.7 / 6.6\} \div 56$ ; 3. correct answer, 0.12 / 0.118 / 0.1179 / 0.11786 ;	Correct answer anywhere on clip with no working gains 3 marks or, if no mp1, 2 marks  IGNORE number of decimal places as long as rounding is correct  If candidates use intermediate values award mps 2 & 3 if correct calculation, e.g  0-2 gives $2.6 \div 14 = 0.1857$ 0-4 gives $3.6 \div 28 = 0.1285$ 0-6 gives $4.5 \div 42 = 0.1071$ 2-4 gives $1 \div 14 = 0.0714$ 2-6 gives $1.9 \div 14 = 0.1357$ 2-8 gives $4 \div 42 = 0.0952$ 4-6 gives $0.9 \div 14 = 0.06429$ 4-8 gives $3.0 \div 28 = 0.1071$ 6-8 gives $2.1 \div 14 = 0.1500$	(3)(expert)

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	1. $24.8 - 14.3 / 10.5$ ; 2. $(10.5) \div 24.8 (x 100)$ ; 3. $42.3 / 42 (\%)$ ;	Correct answer anywhere on clip with no working gains 3 marks IGNORE number of decimal places as long as rounding is correct  Allow ecf for mps 2 & 3 that is any number divide correctly by 24.8 e.g. $(24.8 - 7.7) = 17.1 \div 24.8 (x 100) = 68.95161 \%$	(3)(expert)



Question Number	Answer	Additional Guidance	Mark																												
1(c)	<ol style="list-style-type: none"> <li>1. all processes cause a decrease / eq ;</li> <li>2. frozen dessert is most rich / eq ;</li> <li>3. jam is the poorest source/ eq ;</li> <li>4. storage decreases it further / eq ;</li> <li>5. comment on quantity of a product needed to give 40 mg per day ;</li> <li>6. manipulation of figures to show relevant difference of Vit C content of products ;</li> </ol>	<p>IGNORE ref to fresh pineapple</p> <p>Mp1 Piece together but only if ALL 3 products mentioned</p> <p>Mp 2 ACCEPT converse argument IGNORE high Vit C</p> <p>mp 3 ACCEPT converse argument IGNORE low Vit C</p> <p>Mp 5 quantity may be number of (100g) portions</p> <p>e.g.</p> <table border="1"> <thead> <tr> <th></th> <th><b>% loss (given)</b></th> <th>mg loss</th> <th>mg left</th> </tr> </thead> <tbody> <tr> <td>jam</td> <td><b>0.423</b></td> <td>10.49</td> <td>14.31</td> </tr> <tr> <td>juice</td> <td><b>0.358</b></td> <td>8.88</td> <td>15.92</td> </tr> <tr> <td>dessert</td> <td><b>0.125</b></td> <td>3.10</td> <td>21.70</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>diffs</th> <th>%</th> <th>mg</th> </tr> </thead> <tbody> <tr> <td>jam/juice</td> <td>6.5</td> <td>1.612</td> </tr> <tr> <td>jam/dessert</td> <td>29.8</td> <td>7.3904</td> </tr> <tr> <td>juice/dessert</td> <td>23.3</td> <td>5.7784</td> </tr> </tbody> </table>		<b>% loss (given)</b>	mg loss	mg left	jam	<b>0.423</b>	10.49	14.31	juice	<b>0.358</b>	8.88	15.92	dessert	<b>0.125</b>	3.10	21.70	diffs	%	mg	jam/juice	6.5	1.612	jam/dessert	29.8	7.3904	juice/dessert	23.3	5.7784	(4)(expert)
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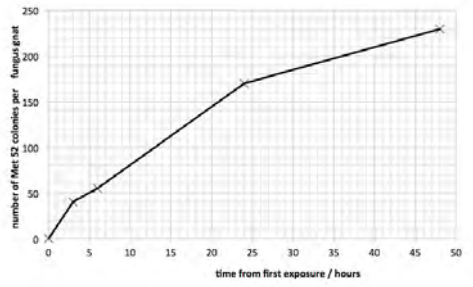
Question Number	Answer	Additional Guidance	Mark
2(a)	<ol style="list-style-type: none"><li>1. can {cause financial loss / reduce profit} / eq ;</li><li>2. by (up to) 20 % ;</li><li>3. {eat / eq} roots;</li><li>4. allowing pathogens to enter ;</li><li>5. causing death of plants / roots rot ;</li><li>6. transmit diseases from plant to plant (as adults) ;</li></ol>	Mp 2 ACCEPT 1/5	(3)(expert)

Question Number	Answer	Additional Guidance	Mark
2(b)	<ol style="list-style-type: none"> <li>1. all stages shown ;</li> <li>2. in correct sequence ;</li> <li>3. days of each stage shown ;</li> </ol>	<p>IGNORE other annotations and diagrams such as bar charts</p> <p>mp 2 ACCEPT as cycle or flow chart</p>  <pre> graph TD     eggs -- "2-7 days" --&gt; larvae     larvae -- "5-14 days" --&gt; pupae     pupae -- "4-6 days" --&gt; adults     adults -- "4-6 days" --&gt; eggs     </pre>	(3)(grad)

Question Number	Answer	Additional Guidance	Mark
2(c)	<ol style="list-style-type: none"> <li>1. loss is \$46 000 ;</li> <li>2. cost is \$4 300 ;</li> <li>3. treatment is cost effective / eq ;</li> <li>4. idea of cost of preventing run-off / pollution ;</li> <li>5. idea of cost of protective equipment ;</li> </ol>	<p>Mps 1 and 2 ACCEPT \$41 700 net loss</p> <p>Mp 5 IGNORE <i>treating</i> allergies</p>	(4)(expert)

Question Number	Answer	Additional Guidance	Mark
2(d)(i)	<ol style="list-style-type: none"> <li>1. infecting {non-harmful insects / named example} ;</li> <li>2. idea of {food web effect / effect on pollinators} ;</li> </ol> <p>OR</p> <ol style="list-style-type: none"> <li>3. possible pollution of water sources ;</li> <li>4. credit a relevant consequence ;</li> </ol>	<p>Mp 2 ACCEPT ref to biodiversity loss</p> <p>mp 4 e.g. harming fish, food web effect IGNORE death / eutrophication</p>	(2)(expert)

Question Number	Answer	Additional Guidance	Mark
2(d)(ii)	<ol style="list-style-type: none"> <li>sensitisation / allergy ;</li> <li>wearing (waterproof gloves / eye goggles / long-sleeved shirt / long pants / shoes plus socks / a dust filtering mask) ;</li> </ol>		(2) (expert)

Question Number	Answer	Additional Guidance	Mark
2(e)(i)	<ol style="list-style-type: none"> <li>correct x and y linear scales chosen (x - e.g. 10, 20, 30, etc, y e.g. 10, 20, 30 etc) ;</li> <li>axes correctly labelled with units (x time from first exposure to Met 52 / hours, y mean number of <i>Metarhizium</i> colonies per gnat) ;</li> </ol>		(2)(grad)

Question Number	Answer	Additional Guidance	Mark
2(e)(ii)	<ol style="list-style-type: none"> <li>1. it forms colonies on gnats / the number of colonies rises with time / eq ;</li> <li>2. gnats will be {reduced in number / killed / eliminated / eq} ;</li> </ol>	IGNORE positive correlation	(2)(expert)

Question Number	Answer	Additional Guidance	Mark
2(f)	<ol style="list-style-type: none"> <li>1. predatory mites ;</li> <li>2. specific (to gnats) / only effective at {surface / top 1 cm soil} ;</li> </ol> <p>OR</p> <ol style="list-style-type: none"> <li>3. nematodes ;</li> <li>4. more expensive / more time consuming / more frequent application needed ;</li> </ol>		(2)(grad)

