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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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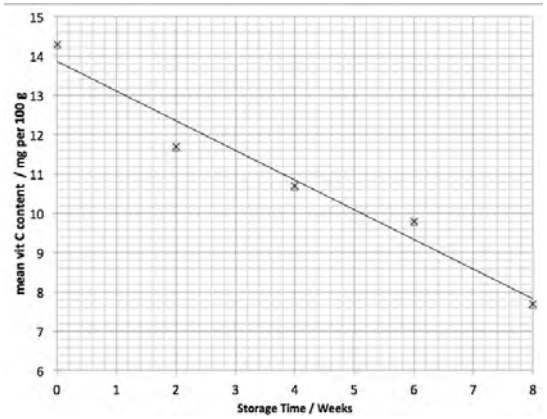
General Marking Guidance

- 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)	1. age / ripeness of fruit ; 2. choose same age / ripeness / eq ; OR 3. temperature/ time of heating pineapple ; 4. heat for {same / stated} time / at {same / constant / stated} temperature ; OR 5. mass of sugar added ; 6. use {same / stated} mass ;	Allow how variable controlled even if on variable line, e.g. **"mass of sugar added should be 50g". This** gains mps 5 and 6. MP3 DO NOT CREDIT temperature of storage MP4 IGNORE if storage of {fruit / jam}	(2)(grad)

	Answer	Additional Guidance	Mark
1(a)(iii)	1. take {equal / stated} {mass / volume} samples (of the jam from each container) ; 2. mix with water ; 3. of {equal / stated} volume (for each sample) ; 4. {stir /eq} for {equal / stated} time ; 5. filter / eq ;		(3)(expert)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	A axes right way round and linear (x storage time , y- mean vit C content) ; L axes correctly labelled, and with units, (x), weeks and (y), {mg 100 g^{-1} / mg per 100 g} ; P correct plotting ; S reasonable line of best fit drawn ;	DO NOT ACCEPT if extrapolated beyond 8 weeks  	(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} ÷ 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 ÷ 14 = 0.1857 0-4 gives 3.6 ÷ 28 = 0.1285 0-6 gives 4.5 ÷ 42 = 0.1071 2-4 gives 1 ÷ 14 = 0.0714 2-6 gives 1.9 ÷ 14 = 0.1357 2-8 gives 4 ÷ 42 = 0.0952 4-6 gives 0.9 ÷ 14 = 0.06429 4-8 gives 3.0 ÷ 28 = 0.1071 6-8 gives 2.1 ÷ 14 = 0.1500	(3)(expert)

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	1. 24.8 - 14.3 / 10.5 ; 2. (10.5) ÷ 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 ÷ 24.8 (x 100) = 68.95161 %	(3)(expert)

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>1(c)</td><td>1. all processes cause a decrease / eq ;

2. frozen dessert is most rich / eq ;

3. jam is the poorest source/ eq ;

4. storage decreases it further / eq ;

5. comment on quantity of a product needed to give 40 mg per day ;

6. manipulation of figures to show relevant difference of Vit C content of products ;</td><td>IGNORE ref to fresh pineapple

Mp1 Piece together but only if ALL 3 products mentioned

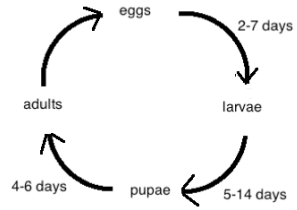
Mp 2 ACCEPT converse argument
IGNORE high Vit C

mp 3 ACCEPT converse argument
IGNORE low Vit C

Mp 5 quantity may be number of (100g) portions

e.g.
<table>
<tr><th></th><th>% loss (given)</th><th>mg loss</th><th>mg left</th></tr>
<tr><td>jam</td><td>0.423</td><td>10.49</td><td>14.31</td></tr>
<tr><td>juice</td><td>0.358</td><td>8.88</td><td>15.92</td></tr>
<tr><td>dessert</td><td>0.125</td><td>3.10</td><td>21.70</td></tr>
</table>
<table>
<tr><th>diffs</th><th>%</th><th>mg</th></tr>
<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>
</table></td><td>(4)(expert)</td></tr>
</table>

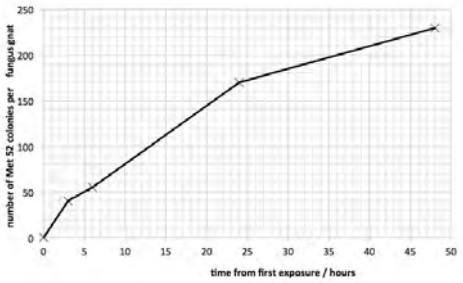
Question Number	Answer	Additional Guidance	Mark
2(a)	1. can {cause financial loss / reduce profit} / eq ; 2. by (up to) 20 % ; 3. {eat / eq} roots; 4. allowing pathogens to enter ; 5. causing death of plants / roots rot ; 6. transmit diseases from plant to plant (as adults) ;	Mp 2 ACCEPT 1/5	(3)(expert)

Question Number	Answer	Additional Guidance	Mark
2(b)	1. all stages shown ; 2. in correct sequence ; 3. days of each stage shown ; 	IGNORE other annotations and diagrams such as bar charts mp 2 ACCEPT as cycle or flow chart	(3)(grad)

Question Number	Answer	Additional Guidance	Mark
2(c)	1. loss is $46 000 ; 2. cost is $4 300 ; 3. treatment is cost effective / eq ; 4. idea of cost of preventing run-off / pollution ; 5. idea of cost of protective equipment ;	Mps 1 and 2 ACCEPT $41 700 net loss Mp 5 IGNORE *treating* allergies	(4)(expert)

Question Number	Answer	Additional Guidance	Mark
2(d)(i)	1. infecting {non-harmful insects / named example} ; 2. idea of {food web effect / effect on pollinators} ; OR 3. possible pollution of water sources ; 4. credit a relevant consequence ;	Mp 2 ACCEPT ref to biodiversity loss mp 4 e.g. harming fish, food web effect IGNORE death / eutrophication	(2)(expert)

Question Number	Answer	Additional Guidance	Mark
2(d)(ii)	1. sensitisation / allergy ; 2. wearing (waterproof gloves / eye goggles / long-sleeved shirt / long pants / shoes plus socks / a dust filtering mask) ;		(2) (expert)

Question Number	Answer	Additional Guidance	Mark
2(e)(i)	1. correct x and y linear scales chosen (x - e.g. 10, 20, 30, etc, y e.g. 10, 20, 30 etc) ; 2. axes correctly labelled with units (x time from first exposure to Met 52 / hours, y mean number of *Metarhyzium* colonies per gnat) ;		(2)(grad)

Question Number	Answer	Additional Guidance	Mark
2(e)(ii)	1. it forms colonies on gnats / the number of colonies rises with time / eq ; 2. gnats will be {reduced in number / killed / eliminated / eq} ;	IGNORE positive correlation	(2)(expert)

Question Number	Answer	Additional Guidance	Mark
2(f)	1. predatory mites ; 2. specific (to gnats) / only effective at {surface / top 1 cm soil} ; OR 3. nematodes ; 4. more expensive / more time consuming / more frequent application needed ;		(2)(grad)

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