GradeMax



Mark Scheme (Results)

January 2020

Pearson Edexcel International Advanced Level In Biology (WBI13)
Paper 01Practical Skills in Biology I

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January 2020
Publications Code IAL_2001_WBI13_01
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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)	An explanation that includes two of the following points: • there is a correlation (between vitamin C in the diet and CVD) (1) • effect of vitamin C on an aspect of CVD	ACCEPT idea of correlation describe and in either direction. E.g. If vit C is high risk of CVD is low/high e.g. affects plaque formation/LDLs/ cholesterol / damage to endothelium/ atherosclerosis	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	An explanation that includes the following points: • colour change from **blue** to colourless (1) • because DCPIP is reduced (1)	ACCEPT DCPIP gains electrons or gains hydrogen	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	A calculation showing the following steps: • equivalence of DCPIP calculated (1) • concentration of vitamin C calculated and quoted to 1 d.p. (1)	• = 1.5 x 10 OR 15 OR ÷26.1 • 15 ÷ 26.1 = 0.6 (mg cm^{-3}) Correct answer with no working shown gains both marks	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	A calculation showing the following steps. • correct figures from table manipulated appropriately (1) • percentage calculated and quoted to maximum of 2 d.p (1)	• 0.4 ÷ 9.4 • × 100 = 4.26 / 4.3 (%) Correct answer with no working shown gains both marks	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(iv)	A graph showing the following features: • axes correctly labelled with units (1) • both standard deviations (SDs) correctly plotted (1)	each juice named x 6 and mean concentration of vitamin C (in fruit juice) / mg cm^{-3}	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(v)	An answer that includes the following. • carton juice has less vitamin C (in all cases) (1) • biggest difference is with lime juice / smallest difference is with orange juice (1) • carton juice content is less variable than fresh / SD of carton juice is smaller than SD of fresh juice (1) • the difference between fresh juice and carton juice is significant / standard deviation of fresh juice and carton juice do not overlap (1)	ACCEPT converse ACCEPT converse	**(3)**

Question Number	Answer	Additional Guidance	Mark
2(a)	A description that includes the following points. • how fibre fixed (1) • how force applied (1) • one variable which should remain constant stated (1) • replicate (the experiment/measurements) (1) • (and) calculate the mean/SD (1)	'attached to a retort stand / hanging from a clamp' e.g. gradual addition of masses / increase tension of a newton metre gradually e.g. Relative humidity / temperature / length of fibre	**(4)**

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	An answer that includes the following points: • a (transverse) section/layer/slice of the fibre is cut (1) • ensure section is flat (1) • graticule calibrated (with stage micrometer) (1) • diameter measured/found • and converted to measurement with calibration data (1) • area calculated using πr^2 (1)	ACCEPT place on slide with a coverslip ACCEPT a description	**(5)**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>2(b)(ii)</td><td>A drawing showing:

• suitable table (1)

• headings identified as tensile strength with units (MPa) and species (1)

• data correctly entered (1)</td><td>
<table>
<tr><td>Fibre</td><td>Tensile Strength / MPa</td></tr>
<tr><td>Curaua</td><td>540</td></tr>
<tr><td>Jute</td><td>250</td></tr>
<tr><td>Coir</td><td>90</td></tr>
<tr><td>Piasava</td><td>130</td></tr>
<tr><td>Sisal</td><td>490</td></tr>
</table>
</td><td>(3)</td></tr>
</table>

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>2(b)(iii)</td><td>A calculation showing the following steps:

• tensile strength for jute read from the graph (1)

• substituted into the formula (1)

• formula rearranged and cross sectional area calculated (1)</td><td>250

250 = 1.08 ÷ area

Area =1.08 ÷ 250

area = 0.0043/0.00432/0.004/4.32 x 10^{-3} (mm^2)

Correct answer with no working shown gains three marks</td><td>(3)</td></tr>
</table>

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	• concentration of detergent		**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	An answer that includes two of following: • temperature (1) • pH (1) • volume of detergent solution (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
3(a)(iii)	temperature: • thermostatically controlled water bath / incubator/ac room/environmental chamber (1) volume of detergent solution: • appropriate measuring device (1) pH: • use of buffer (1)	ACCEPT answers from 3(a)(ii)	**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(iv)	An explanation that includes the following points: • in order to avoid (physical/more) damage to the discs/membranes/cells (1) • which would cause more pigment release (1) • causing the results to be invalid (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
3(a)(v)	An explanation that includes the following points: • to calculate standard deviation / measure reliability / variability (1) • to identify anomalies (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	• to allow any pigment leakage that is not due to detergent to be measured / as a control / for comparison / the reading of 0% detergent is not 100% / only 97% (1)		**(1)**

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	A graph showing the following features: • A axes correctly orientated and linear (1) • L axes correctly labelled, (x – concentration of detergent solution, y - Mean percentage of light transmitted (through the solution) and with units (1) • P correct plotting (1) • S points joined with straight lines (1)		**(4)**

Question Number	Answer	Additional Guidance	Mark
3(b)(iii)	An explanation that includes three of the following points: • the discs (that were in the detergent) will continue to lose pigment **as** membrane (permanently) damaged (1) • the discs that were in 0.0% detergent solution will have no loss of pigment as the membranes were not damaged (1) • discs will lose pigment more slowly/stop because there is less/no pigment left in the beetroot (1) • discs which were in higher concentrations of detergent will have slowest rate of loss, because they have the least pigment left (1)	Accept reverse argument	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(b)(iv)	An answer that includes three of the following points: similarities: • both cause pigment leakage (1) differences: • temperature leads to a greater pigment leakage than detergent (1) • temperature effect on pigment release is sudden above 40/ non-significant below 40 but detergent effect is gradual across the range (1)	ACCEPT answers in terms of light transmission IF link between this and pigment release is made clear	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(b)(v)	An answer that includes the following points: • would be 25% • from the graph at 60 and 70 / after 60 transmission is same / has levelled off (1) • because all pigment has leaked out/there is an equilibrium (when graph levels off) (1)		**(3)**

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