Mark Scheme (Results)

January 2020

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

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)**