Mark Scheme (Results)

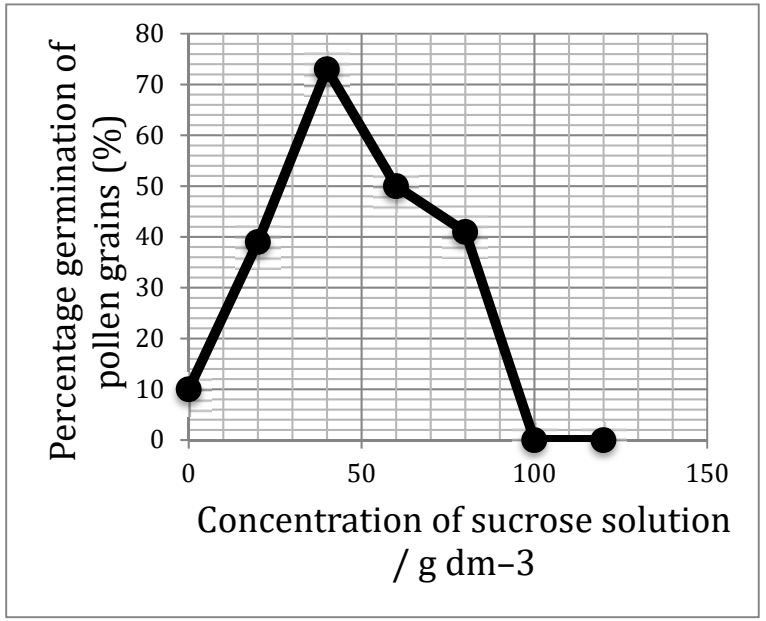
Summer 2019

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

Question number	Answer	Additional guidance	Mark
1(a)(i)	• concentration of sucrose (solution) (1)	**Accept** sucrose concentration **Do not accept** 'sucrose' without concentration	**(1)**

Question number	Answer	Additional guidance	Mark
1(a)(ii)	• temperature / pH (1)	**Accept** light intensity	**(1)**

Question number	Answer	Additional guidance	Mark
1(a)(iii)	An explanation that includes the following points: • an effect of the factor on the germination (1) • because enzymes are involved in (pollen germination/metabolism) (1) • description of {metabolism/enzymes} being affected by the factor (1)	**Accept** growth **Do not accept** reference to seeds	**(3)**

Question number	Answer	Additional guidance	Mark
1(b)(i)	A graph showing the following features: • A axes the right way round (x = sucrose conc., y = percentage germination) and linear scale (1) • L axes correctly labelled with units (x - sucrose concentration, g dm-3, y – percentage germination of pollen grains (1) • P correct plotting of all values (1) • S line joining points accurately ruled (1)		**(4)**

Question number	Answer	Additional guidance	Mark
1(b)(ii)	An explanation that includes the following points: • repeat investigation using more sucrose concentrations (1) • between 20 and 60 g dm-3 (1)		**(2)**

Question number	Answer	Additional guidance	Mark
1(c)(i)	A calculation showing the following steps: • selection of correct values from the table (1) • calculation of percentage (1)	166 – 78 / 88 Example of calculation: (88 ÷ 78) × 100 = 112.82 % **Accept** 113/112.8/112.821 Correct answer with no working gains both marks	**(2)**

Question number	Answer	Additional guidance	Mark
1(c)(ii)	An answer that includes five of the following points: • use a range of at least 5 concentrations of (sucrose) solutions (1) • detail of dilution method using the sucrose solution (of 500 g dm^{-3}) (1) • at least one control variable named (1) • use 100 ppm boric acid solution (1) • use a microscope and graticule to measure pollen tube length (1) • stated times (for measurements of pollen tube) (1)	**Accept** stock and distilled water as one of the concentrations.	**(5)**

Question number	Answer	Additional guidance	Mark
2(a)(i)	A description which includes the following points: • use of Benedict's (reagent) (1) • heating (1)	 **Accept** Fehling's or other suitable test **Accept** water bath qualified e.g. hot/warm/boiling/stated temperature above 40°C	**(2)**

Question number	Answer	Additional guidance	Mark
2(a)(ii)	An explanation that includes the following points: • use same mass for each food (1) • use same volume of distilled water for each (1) • standardise the test procedure (1) • compare result with a colour chart described (1)	 **Accept** volume e.g volume of Benedict's added, time of heating/temperature/same volume of extract e.g. that has been devised using a range of concentrations of reducing sugars / in which the colours correspond to a range of concentrations of reducing sugars	**(3)**

Question number	Answer	Additional guidance	Mark
2(a)(iii)	An answer that includes the following points: • take the food residue (from the filter paper) (1) • and test it (for reducing sugars) with Benedict's (1)	**Accept** Fehling's or other suitable test	**(2)**

Question number	Answer	Additional guidance	Mark
2(b)	An answer that includes all of the following in this order: apple | sweet potato | potato | bread | cashew nut (2)	2 marks all correct 1 mark if one mistake made e.g two foods reversed / one food out of place leaving the rest out of place but in correct sequence	**(2)**

Question number	Answer	Additional guidance	Mark
2(c)(i)	An explanation that includes the following points: • apple (1) • because there was {more / most} reducing sugar (1) • therefore leaving least copper ions in the solution (1)	**Accept** the most / more copper (ions) {have reacted with reducing sugar / been removed}	**(3)**

Question number	Answer	Additional guidance	Mark
2(c)(ii)	An answer that includes four of the following points: • use {standard / known} {mass/volume} of sweet potato / use a standard volume of sweet potato extract / volume of extraction liquid (1) • carry out reducing sugar test (1) • {filter the solution / remove precipitate} (after the test is carried out) (1) • {weigh the precipitate remaining in the filter paper / measure intensity of blue color in filtrate} (1) • convert this {mass / intensity} to a concentration of reducing sugar / compare colour of tube contents precipitate with a colour chart qualified (1)	**Accept** size e.g. that has been devised using a range of concentrations of reducing sugars / in which the colours correspond to a range of concentrations of reducing sugars	**(4)**

Question number	Answer	Additional guidance	Mark
3(a)(i)	An explanation that includes four of the following points: • for equilibration (1) • because mixing the solutions at different temperatures would make the temperature ≠ 40 °C (1) • (40 °C could be) optimum for urease (1) • (so if the mixture) {cooled down / warmed up} rate would change during experiment (1) • ensures only pH is varied (1)	**Accept** when mixing the temperature stays at 40°C / constant	**(4)**

Question number	Answer	Additional guidance	Mark
3(a)(ii)	An explanation that includes the following points: • run the experiment with a range of different concentrations (1) • choose a combination in which the rate of change is not too {high / fast} / too {low / slow} / time taken is not too {long / short} (1)		**(2)**

<table>
<tr><th>Question number</th><th>Answer</th><th>Additional guidance</th><th>Mark</th></tr>
<tr><td>3(b)(i)</td><td>A table showing the following features:

• suitable table drawn
(1)

• headings of pH and concentration of ammonia
(1)

• with units
(1)

• data correctly entered
(1)</td><td>Example of table drawn

<table><tr><th>pH</th><th>concentration of ammonia / a.u.</th></tr><tr><td>3.0</td><td>0</td></tr><tr><td>4.0</td><td>10</td></tr><tr><td>6.5</td><td>60</td></tr><tr><td>6.8</td><td>80</td></tr><tr><td>7.3</td><td>100</td></tr><tr><td>8.0</td><td>60</td></tr><tr><td>9.0</td><td>30</td></tr></table></td><td>(4)</td></tr>
</table>

Question number	Answer	Additional guidance	Mark
3(b)(ii)	• figures read from graph and converted into rate (1) • appropriate units given (1)	Example of calculation: 60 × 4 = 240 OR 60 ÷ 15 = 4 OR 60 ÷ (15 x 60) = 0.07/0.067/0.0667 (240) a.u. $hour^{-1}$ OR (4) a.u. min^{-1} OR (0.07/0.067/0.0667) a.u s^{-1}	**(2)**

Question number	Answer	Additional guidance	Mark
3(b)(iii)	An answer that includes the following points: **Similarities** • both sets of results have a similar pattern (1) • both peak at same pH (1) **Differences** • no ammonia produced at pH 4 after 15 minutes but {some / 10 a.u.} produced at 60 minutes (1) • more ammonia produced at every pH after 60 minutes than after 15 minutes (1)	**Accept** 60 min graph starts at pH 3 and 15 at pH 4	**(3)**

Question number	Answer	Additional guidance	Mark
3(c)	• 0.36 a.u.min-1 (1)	**Accept** answers in range of 0.3 to 0.4 $a.u.min^{-1}$ **Accept** other values with corresponding appropriate units e.g. rate expressed per second 0.003 to 0.007 $a.u.sec^{-1}$	**(1)**