Pearson Edexcel

Mark Scheme (Results)

Summer 2019

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

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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.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

  i) ensure that text is legible, and that spelling, punctuation and grammar are accurate so that meaning is clear
  ii) select and use a form and style of writing appropriate to purpose and to complex subject matter
  iii) organise information clearly and coherently, using specialist vocabulary when appropriate.

Using the Mark Scheme

Examiners should look for qualities to reward rather than faults to penalise. This does NOT mean giving credit for incorrect or inadequate answers, but it does mean allowing candidates to be rewarded for answers showing correct application of principles and knowledge. Examiners should therefore read carefully and consider every response: even if it is not what is expected it may be worthy of credit.

The mark scheme gives examiners:

- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

/ means that the responses are alternatives and either answer should receive full credit.
( ) means that a phrase/word is not essential for the award of the mark, but helps the examiner to get the sense of the expected answer.
Phrases/words in **bold** indicate that the meaning of the phrase or the actual word is **essential** to the answer.
ecf/TE/cq (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Candidates must make their meaning clear to the examiner to gain the mark. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

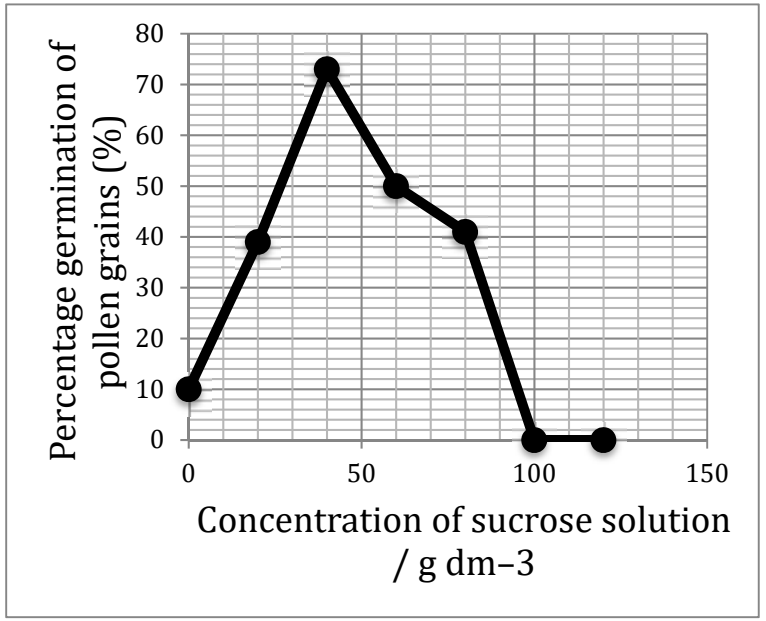
- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities. Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

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)**

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