Mark Scheme (Results)

Summer 2025

Pearson Edexcel International Advanced Subsidiary 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.

Question Number	Answer	Additional Guidance	Mark
1(a)	An answer that includes the following points: • names (1) • order correct (1)	 Prophase, Metaphase, Anaphase, Telophase (in any order) Prophase, Metaphase, Anaphase, Telophase Accept PMAT	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	An answer that includes the following points: • reference to enzymes (in mitosis) (1) • explanation of effect of temperature (on enzymes) (1)	IGNORE ref. to micro-organisms e.g. it is optimum (for enzymes) / prevent (enzymes) from denaturing / working too slowly	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	• presence of trifluralin (or not) (1)	accept concentration of trifluralin	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	An answer that includes **two** of the following points: • **trifluralin** may prevent / slow down / speed up / inhibit / stimulate} germination (1) • to ensure that the {seeds / seedlings} (used) were {viable / healthy} (1) • all started treatment at the same stage (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(iv)	An answer that includes the following points: • as a control (1) • to eliminate the effect of other factors than the presence of trifluralin (1) • so that any changes using trifluralin could be attributed to trifluralin (only) (1)	accept allows a comparison to be made not control **variable** e.g. the solvent	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	An answer that includes four of the following points: • obtain root tip (1) • (root tips) {placed in (warm) acid / macerated / teased / described} (1) • (root tips) then placed in appropriate named stain (1) • (root tip) squashed (1) • view through microscope on high power (1) • mitotic **stages** counted (1)	accept a correct description e.g. terminal 4 mm of the root e.g. (acetic) orcein, Schiff's reagent, methylene blue, toluidine blue, acetocarmine, Feulgen's accept description accept view under high power / resolution do not accept just see	**(4)**

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	A calculation with the following steps: • 80% of cells seen were in stage 2 (1) • 80% of 98 is 78.4 which is 78 cells (1)	ACCEPT the number 80 for 1 mark ACCEPT 78.4 for 1 mark	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(c)(iii)	A suggestion that includes the following points: • there are no cells in {stage 3 / anaphase} or {stage 4 / telophase} / the division stops at {stage 2 / metaphase / before anaphase} (1) • because the chromosomes are not moving apart (1) • the spindle apparatus is {not formed / does not work} (1)	candidates will express this in various way accept inhibits anaphase need not say trifluralin as in stem	**(3)**

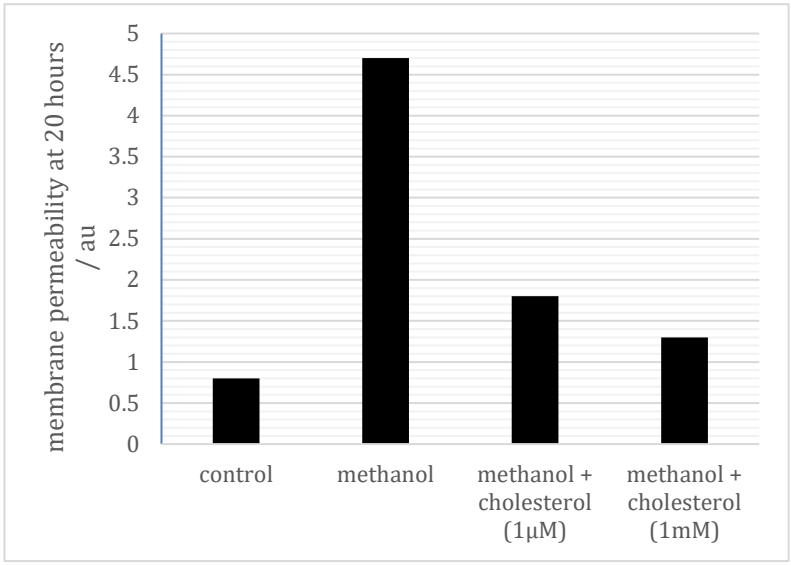
Question Number	Answer	Additional Guidance	Mark
2(a)(i)	A justification which includes the following points: • equal size pieces of beetroot cut, ***so that*** size does not affect quantity of pigment / same {SA / SA/V} so that SA does not affect quantity of pigment **leaking out** (1) • beetroot pieces rinsed (under running water) ***to*** remove any (excess) pigment (leaked out by physical damage) (1) • one named control variable kept constant, with suitable reason (1) • the solution formed is shaken (before sample taken), ***to*** disperse the pigment (1) • description of method of assessing quantity of pigment lost, with reason why it is a suitable method / detail of use of method with why this is done (1) • use water ***as a*** control (1) • repeat ***in order*** to check reliability / variability / calculate mean / calculate SD (1)	accept for (valid) comparison to be made **once** for mp 1 OR 2 OR 3 OR 6 if actual reason not given accept a description e.g as use a cork same length accept amount of pigment = quantity accept same number of beetroot pieces *so that*.. e.g. temperature kept constant ***because it*** can affect pigment leakage / volume of solvent used ***as would*** dilute pigment by different degrees / same (age / variety / type / cultivar / species) as this may affect pigment content do not accept time as in stem e.g. using colorimeter *as it is* a quantitative method / zeroing with plain solvent *to* remove (systematic) error accept average accept for reliability	(**5**)

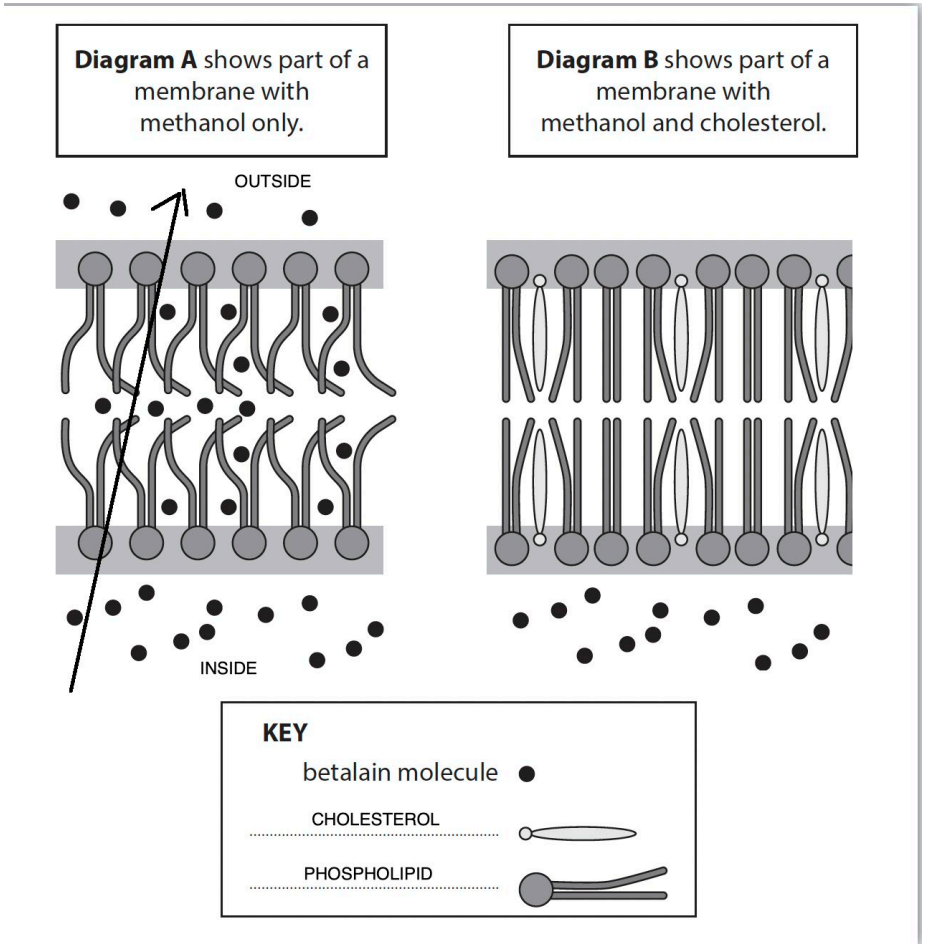
<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr>
<td>2(a)(ii)</td>
<td>A table with the following features:

• correct headings including units for MeOH with cholesterol cells (1)

• correct unit, a.u.(1)

• all data entered correctly (1)</td>
<td>
<table>
<tr><th>treatment / solution / liquid (immersed in)</th><th>membrane permeability at 20 hours / au</th></tr>
<tr><td>control / water</td><td>0.8</td></tr>
<tr><td>methanol</td><td>4.7</td></tr>
<tr><td>methanol + cholesterol
1 μmol dm^{-3}</td><td>1.8</td></tr>
<tr><td>methanol + cholesterol
1 mmol dm^{-3}</td><td>1.4</td></tr>
</table>
do not accept solvent as heading
do not accept units in cells
</td>
<td>(3)</td>
</tr>
</table>

Question Number	Answer	Additional Guidance	Mark
2(a)(iii)	A graph with the following features: • A axes correct x –treatment / solution, y – membrane permeability, no break in axis (1) • L y axis correctly labelled with units x axis AND the bars correctly labelled or a key to the bars (1) • P correct plotting on a linear scale on y (1) • S bar chart (1)	 treatment / solution Do not penalise heading errors twice Ignore order of bars do not accept bars touching each other for mp4	**(4)**

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	Key correctly completed (2)	 accept correct labelling of inside and outside on diagram B	**(2)**
2(b)(ii)	A labelled diagram with the following features: inside and outside of cell labelled (1)		**(1)**
2(b)(iii)	A labelled diagram with the following features: correct arrow in direction from bottom to top of diagram A, any length (1)		**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	An answer that includes three of the following points: • **alpha** glucose molecules (1) • (joined by) glycosidic bonds (1) • (mixture) amylopectin and amylose (1) • detail of amylose OR detail of amylopectin (1)	e.g., amylose, joined by (only) 1,4 glycosidic bonds / unbranched amylopectin is branched, has (1,4 and) 1,6 bonds do not accept has ONLY 1,6 bonds	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	An explanation that includes three of the following points: • **make** known concentrations of starch (1) • add iodine (solution) (to each / sample) (1) • (colour of) sample (with added iodine) **compared with** {the known standards / colour chart} (1) • the darker the colour the more starch or reverse (1)	accept a description e.g. serially dilute a stock starch solution do not accept just colour chart or colour chart *used* do not accept compare with calibration curve	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(a)(iii)	An answer which includes the following points: • (the quantitative result is) an {exact / accurate / actual / objective / absolute} (1) • (the semi-quantitative result) {gives a range / an approximate / subjective value / an estimate / involves an element of judgment} (1)	accept precise	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	A calculation with the following steps: • correct numbers identified and **difference found** (1) • numbers substituted into formula and correct answer derived. (1)	e.g. highest 33.65, lowest 29.64, difference is 4.01 e.g. 4.01 ÷ 31.65 x 100 = 12.67 % accept 12.7 / 13 do not accept 13.0 or 12.70 correct answer with no working gains both marks. 13.0 and 12.70 get 1 mark	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	An answer which includes the following points: **msA** • cut out section B (1) • accept determine mass (of B) / determine the mass of the layers (of section B) (1) • quote the starch content of each layer of B from the table, 31.79, 33.26, 29.64 **or** average starch content of section B from table / described • description of the use of the data (1) OR **msB** • cut out section B (1) • accept determine mass (of B) / determine the mass of the layers (of section B) (1) • determine the starch content of each layer by experiment described / determine starch content of B by experiment described • convert {colorimeter readings / colour standard readings into starch concentrations	candidates will express this in many ways, e.g. cut off A and C and dispose accept if implied by e.g. quoting correct total, 94.69 i.e. 31.5§6 e.g. add up all the layer figures for B and divide by 3. they may say this in words if not then a correct piece of maths may be given (see notes in Practice items) e.g. a simple description of use of iodine and colorimeter or colour standard	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(b)(iii)	An answer which includes the following points: • (repeat) measurements in same conditions / using same equipment (1) • calculate mean (1) • {calculate / determine} named measure of variability (1)	 do not accept repeat on same root accept one named relevant conditions, e.g. temp not mass accept average e.g. SD / SE / range / plot error bars	 **(3)**

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