GradeMax

Pearson

Mark Scheme (Results)

October 2025

Pearson Edexcel International Advanced Subsidiary Level in Biology
WBI13/01

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

October 2025
Question Paper Log Number P78823A
Publication Code WBI13_01_2510_MS
All the material in this publication is copyright
© Pearson Education Ltd

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.

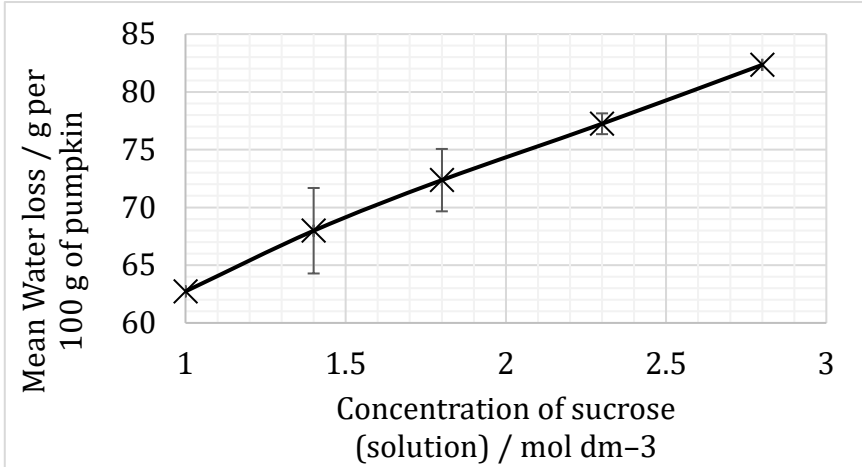
Question Number	Answer	Additional Guidance	Mark
1(a)(i)	An answer that includes the following: • (bathing) solution has a {high(er) sugar concentration than / low(er) water potential than / is hypertonic to} {cells / tissue} (1) • (so water moves out) by osmosis / {from high to low WP / low to high concentration} (of sugar) (1)	reverse argument in each case accept ref to inside / outside fruit accept solute /sucrose accept cytoplasm / fruit accept down a concentration gradient	Expert (2)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	• (submerging) does not damage the fruit / does not affect taste (1)	allow converse statement accept harm / a relevant description of damage, e.g breaks membranes, contents leak out destroys vitamins ignore effects on enzymes, proteins, plant	Expert (1)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	• concentration of {sucrose / sugar} (solution) (1)		Expert (1)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	An answer that includes the following: • to make the {results / data / investigation} valid (1) • (because) temperature would affect rate of {loss of **water** molecules (from the fruit) / water movement} (1)	accept converse argument accept reliable / make it valid / so, sugar concentration is the only variable affecting water loss / allow comparison do not accept fair test ignore enzymes	Expert (2)

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	An answer that includes the following: • {make up / prepare} **5** sucrose solutions (1) • cut pieces of pumpkin to same size / shape (1) • (and) weigh (1) • place the pieces in each of the sucrose solutions for {the same or stated time / at same or stated temperature} (1) • remove pieces of pumpkin and weigh (1) • (blot) dry before the weighings (in either case) (1) • repeat for **each** concentration (to obtain the mean / SD) (1)	accept 1 → 2.8 accept sugar accept named relevant shape ignore equal accept stated / same mass if stated time 30 min to 1 day if stated temperature 4-30 C accept subtract final from initial or calculate mass change for mp 3 and 5 accept repeat experiment	Expert (5)

Question Number	Answer	Additional Guidance	Mark
1(c)(ii) **Clip with (c)(iii)**	A graph with the following features: • A axes correct (x – sucrose solution concentration, y- water loss) (1) • L all labels correct (x- concentration of sucrose (solution) / mol dm^{-3}, y – mean water loss g per 100 g of pumpkin) (1) • P mean plots correct on a linear scale on both axes (1) • E three errors bars correctly plotted (1) • S points joined with straight lines (1)	 | +SD | -SD | |---|---| | 71.7 | 64.3 | | 75.1 | 69.7 | | 78.1 | 76.3 |	Expert (5)

Question Number	Answer	Additional Guidance	Mark
1(c)(iii) **Clip with (c)(ii)**	An answer that includes the following points: • (some of the SD bars overlap so) not all differences are significant (1) • it is true for 1.8 with 2.3 / it is not true for 1.4 with 1.8 (1)	statement incorrect statement only partially correct accept significant / accept not significant 1.8 with 2.3 do not overlap / 1.4 with 1.8 overlap	expert (2)

Question Number	Answer	Additional Guidance	Mark
1(c)(iv)	A calculation showing the following steps: • correct formula for gradient (1) • gradient calculated and rounded correctly (1)	correct answer gets both marks ignore units e.g. (77.2 – 72.4) ÷ (2.3 – 1.8) e.g. 9.6 becomes <u>10</u> 9.6 with no working gets 1 mark	expert (2)

Question Number	Answer	Additional Guidance	Mark
2(a)	An explanation that includes two of the following: • they reduce (the number / activity) of free radicals (1) • reduce the risk of cardiovascular disease (1) • (by) reducing damage to blood vessels (1)	accept neutralise, remove, stabilise reduce oxidative stress accept heart disease reduce plaque / atheroma / atherosclerosis / cell or tissue damage / endothelial lining, cells promote collagen synthesis	Expert (2)

Question Number	Answer	Additional Guidance	Mark
2(b)	A description that includes four of the following: • use of DCPIP (1) • use known volume DCPIP (1) • add {extract / stock Vitamin C} until no blue colour remains / becomes colourless / decolourises (1) • record volume of {extract / stock Vitamin C} used (1) • do titration again with (stock Vitamin C / extract) (1) • compare the volume of extract added with the volume of stock added / stated correct equation to calculate Vitamin C content	accept titration of DCPIP into extract in mps 2, 3, 4 and 6 accept other appropriate redox dyes throughout, e.g. methylene blue ignore add drops ignore amount accept known Vitamin C concentration = stock accept known Vitamin C concentration = stock concentration of vitamin C in fruit juice = volume of standard solution added ÷ volume of fruit juice added x concentration of standard solution $V_1C_1 = V_2C_2$	Expert (4)

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	An answer that includes the following: • not all vitamin C was recovered during purification (1) • some vitamin C destroyed during purification (1) • other antioxidants in original extract (1)	accept some lost accept removed accept other molecules decolourise with DCPIP	Expert (2)

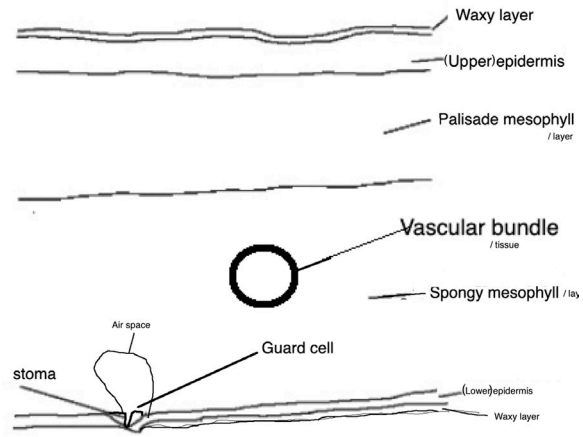
Question Number	Answer	Additional Guidance	Mark
2(c)(ii) **Clip with (c)(iii)**	A table with the following features: • suitable table drawn (1) • headings with units correct (1) • all raw data correctly entered and quoted to 1 dp (1)	<table><tr><td></td><td colspan="2">Mass of Vitamin C / mg per 100 cm^3 (of original extract)</td></tr><tr><td>Fruit (species)</td><td>Imported</td><td>Local</td></tr><tr><td>orange</td><td>9.2</td><td>9.5 / 9.6</td></tr><tr><td>strawberry</td><td>5.8 / 5.9</td><td>8.9 / 9.0</td></tr><tr><td>apple</td><td>5.8 / 5.9</td><td>4.4</td></tr></table>do not accept units in any cells for mp2 mp 3 lost if extra data for purified added	Expert (3)

Question Number	Answer	Additional Guidance	Mark
2(c)(iii) **Clip with (c)(ii)**	An answer that includes the following: • correct selection and addition of values for all local fruit (1) • division of total for all local fruit by number of local fruit and quoted to 3 sig figs.(1)	correct answer gains 2 marks e.g. 22.8 e.g. 7.60 (mg per 100 cm^3) acceptable alternatives 22.9 gives 7.63 23 gives 7.67	Expert (2)

Question Number	Answer	Additional Guidance	Mark
2(c)(iv)	An answer that includes four of the following: • (when comparing means) local fruit has more Vitamin C (1) • but no error bars / SDs so do not know if this is a significant difference (1) • imported apples have more Vit C than local (1) • local {oranges / strawberries} have more Vit C than imported (1) • there is very little difference for oranges / large difference strawberry (1) • imported fruits may be a different variety (1) • a conclusion which matches the points made (1)	0.67 mg per 100 cm^3 / about 10% compare Local, 7.63-7.67 to imported, 6.93 no variability shown accept reverse argument accept reverse argument e.g. suggestion correct / partially correct / partially incorrect / incorrect (1)	Expert (4)

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	A description that includes the following: • count the number of (eyepiece) units (across the diameter of the cell) (1) • calibrate the eyepiece graticule (1) • use of stage micrometer (1) • multiply {number of units / 6} by actual {width / length} of each unit (1)	the diameter of the wbc is 6 units on the eyepiece = count accept description e.g. find the width / length of one eyepiece graticule unit with stage micrometer for mps 2 and 3	Expert (3)

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	An answer that includes the following points: • so that it can be placed on (stage of) a microscope (1) • so that the white cell becomes visible (1) • to make the blood drop flat / to protect the specimen / to stop the {specimen / stain} getting on to the microscope objective lens / prevent dehydration (1)	accept can be moved on stage to see different cell types to make organelles / nucleus / chromosomes visible improve contrast / differentiate stop specimen movement / stop spillage / spread sample on slide	Expert (3)

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	A drawing that includes the following features: • {four / five / six} layers shown in a plan with no cells (1) • proportions correct (1) • one correctly labelled tissue / structure (1) • two more correctly labelled tissues (1)	 rough proportions 1:4:6:1 upper and lower epidermis about same, palisade < spongy, both much more than epidermis	Expert (4)

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	A calculation that includes the following steps: • correct measurement of picture (1) • rearrangement of formula substitution of numbers into rearranged formula and correct calculation (1) • answer in standard form (1)	correct answer for 3 e.g. 5 / 5.1 cm magnification = $\frac{\text{size of image}}{\text{size of real object}}$, size of real object = size of image ÷ magnification size = 50 (mm) ÷ 100 = 0.5 mm = 5×10^2 µm OR size = 51 (mm) ÷ 100 = 0.51 mm = 5.1×10^2 µm allow 5.**0** x 10^2 5×10^x or 500 or 5.1×10^x or 510 for 2	Expert (3)

4.8×10^2