



Mark Scheme (Results)

October 2023

Pearson Edexcel International Advanced Level
In Biology (WBI13) Paper 01
Unit 3: Practical Skills in Biology I

Question Number	Answer	Additional Guidance	Mark
1ai	An answer that includes the following points • (using a light microscope find cell) under low power (1) • then view under high power (1) • calibrate eyepiece graticule / use of stage micrometer • count number of (eyepiece) graticule units over the cell (1) • convert eyepiece graticule units (to microns using calibration) (1) • measure diameter at different positions / orientations (1)	IGNORE electron microscope	expert 5

Question Number	Answer	Additional Guidance	Mark
1a ii	A drawing with the following features • drawing using continuous lines showing correct shape of cell (1) • nucleus drawn with continuous lines in correct position and correct size (1) • any two correct labels (1) • suitable scale line shown (1)	Lose this mark if draw cell wall membrane / cytoplasm / nucleus / mitochondria IGNORE cell wall, wrong labels as long as 2 are correct could be a scale line with suitable measurement / magnification (about 1000 if a 6 cm drawing, others pro-rata)	4

Question Number	Answer	Additional Guidance	Mark
1a ⁱⁱⁱ	A calculation which includes the following steps • conversion of onion cell length to micrometres / cheek cell to mm (1) • division of onion cell length by diameter of human cell and answer quoted as a ratio (1)	= 200 (μm) OR 0.06 mm = 200 ÷ 60 OR 0.2 ÷ 0.06 3.33 : 1 ACCEPT 3.3, 3.33 ACCEPT 1:0.3 NOT 1:3.33, this gets 1 mark	2

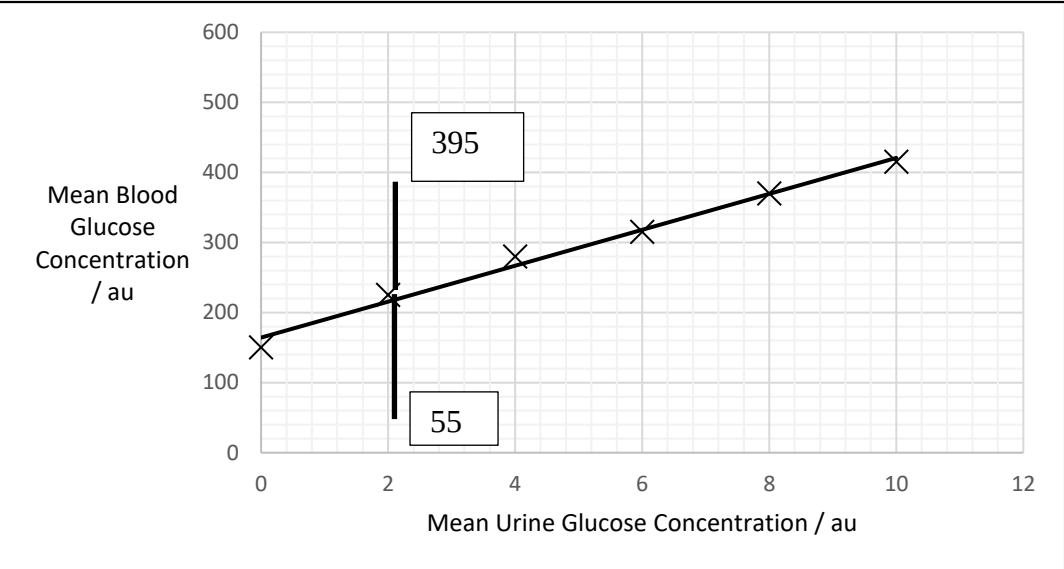
Question Number	Answer	Additional Guidance	Mark
1bi	The following correctly named: • X- Sclerenchyma, Y- Phloem / Sieve (tube element), Z- Xylem (cell / vessel) (2) All three for 2 marks 1 or 2 for one mark.		2

Question Number	Answer	Additional Guidance	Mark
1bii	• {phloem / sieve} cell / correct letter from 1bi	consider ecf from bi	1

Question Number	Answer	Additional Guidance	Mark
2ai	An answer that includes the following points • addition of (Benedict's / Fehling's) solution (1) • heat / place in water bath (and observe colour change) (1)	Water bath must be heated or > 50 C	2

Question Number	Answer	Additional Guidance	Mark																					
2a _{ii}		e.g.<table><thead><tr><th>Appearance</th><th>Glucose concentration / <u>g dm⁻³</u></th><th>Glucose quantity</th></tr></thead><tbody><tr><td>Blue</td><td>0.0</td><td>None</td></tr><tr><td>Green</td><td>0.1 to 0.4</td><td>Trace</td></tr><tr><td>Green with precipitate</td><td><u>0.5</u> to <u>10.0</u></td><td>Very low</td></tr><tr><td>Yellow with precipitate</td><td>10.1 to 15.0</td><td>Low</td></tr><tr><td>Orange with precipitate</td><td><u>15.1</u> to <u>20.0</u></td><td>Moderate</td></tr><tr><td>Red with precipitate</td><td>><u>20.0</u></td><td>High</td></tr></tbody></table>	Appearance	Glucose concentration / <u>g dm⁻³</u>	Glucose quantity	Blue	0.0	None	Green	0.1 to 0.4	Trace	Green with precipitate	<u>0.5</u> to <u>10.0</u>	Very low	Yellow with precipitate	10.1 to 15.0	Low	Orange with precipitate	<u>15.1</u> to <u>20.0</u>	Moderate	Red with precipitate	> <u>20.0</u>	High	2
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Question Number	Answer	Additional Guidance	Mark
2b _i	An answer that includes the following points: - describe how mean obtained (1) - describe how standard deviation obtained (1)	e.g substitute mean and number of observations into equation.	2

Question Number	Answer	Additional Guidance	Mark
2bii	A graph with the following features • L1 x label mean urine glucose concentration / au (1) • L2 y- mean blood glucose concentration / au) (1) • P1 plots correct on a linear scale on both axes (1) • P2 standard deviation plotted correctly (1) • suitable line of best fit drawn (1)	 Mean Blood Glucose Concentration / au Mean Urine Glucose Concentration / au IGNORE extrapolation	5

Question Number	Answer	Additional Guidance	Mark
2biii	An answer that includes the following points: - there is a correlation between the 2 variables / variables may depend on each other / as urine glucose goes up blood glucose goes up (1) - however, the {SDs / error bars} overlap (1) - suggesting that differences not significant)(1)	NOT vice versa to the last alternative NOT range bars	3

Question Number	Answer	Additional Guidance	Mark
2biv	An calculation that includes the following steps : - substitution of values into equation (1) - solving of equation (1) - correct rounding (1)	e.g. $y = 29.3 \times 12 + 154.1$ $= 505.7$ rounded to 506 allow ecf for $12 = 29.3 \times X + 154.1$ $= - 4.849 \text{ (ignore sign)}$ Rounded to 4.85	3

Question Number	Answer	Additional Guidance	Mark
3ai	An answer with the following : • metaphase and anaphase		1

Question Number	Answer	Additional Guidance	Mark
3aii	An answer which includes the following points: Similarities • cytokinesis (occurs) (1) • two (genetically) identical cells formed (1) Differences • cell plate formed in plants and not in animals / animal cell contracts but plant cell forms {vesicles / wall} in middle / plants cells remain connected by {plasmodesmata / pits}, none in animal cells. (1)	accept description, if implied under differences	3

Question Number	Answer	Additional Guidance			Mark								
3biii	A table with the following features : • suitable table drawn (1) • all headings correct (1) • all data correctly entered (1)	<table><tr><td></td><td>number of cells in Interphase</td><td>number of cells in a stage of Mitosis</td></tr><tr><td>Control</td><td>148</td><td>24</td></tr><tr><td>Treated with lectin</td><td>160</td><td>88</td></tr></table>		number of cells in Interphase	number of cells in a stage of Mitosis	Control	148	24	Treated with lectin	160	88	table must have 2 rows and 2 columns minimum Do not allow .0 Extras lose mp 3	. 3
	number of cells in Interphase	number of cells in a stage of Mitosis											
Control	148	24											
Treated with lectin	160	88											

Question Number	Answer	Additional Guidance	Mark
3biv	A calculation that includes the following steps : - determine total number of cells in mitosis in lectin treatment and total number of cells observed (1) - calculate percentage (1)	e.g. 88 and 160+88=248 $(88/248) \times 100 = 35.5 / 36$	2

Question Number	Answer	Additional Guidance	Mark
3bv	An answer that includes the following points : - percentage in mitosis is greater with lectins than without (1) - but we have no idea of variability / difference may not be significant / no SDs (1)	IGNORE number of cells	2

Question Number	Answer	Additional Guidance	Mark
3bvi	An answer that includes the following points : - use of Chi (squared test) (1) - because need to test {the significance of the difference between observed and expected results / association / frequency data} (1)	Allow ecf for t-test	2