



Mark Scheme (Results)

Summer 2025

Pearson Edexcel International GCSE
In Biology (4WBI1) Unit 1B

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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	Mark
1(a)(i)	C (protocists) A is not the answer as <i>Euglena</i> is not in bacteria B is not the answer as <i>Euglena</i> is not in fungi D is not the answer as <i>Euglena</i> is not in viruses	1

Question Number	Answer	Mark
1(a)(ii)	D (U) A is not the answer as P is the membrane B is not the answer as R is the flagellum C is not the answer as T is the nucleus	1

Question Number	Answer	Mark
1(a)(iii)	D (T) A is not the answer as P is the membrane B is not the answer as Q is the cytoplasm C is not the answer as R is the flagellum	1

Question Number	Answer	Mark
1(a)(iv)	A (P) B is not the answer as Q is the cytoplasm C is not the answer as R is the flagellum D is not the answer as U is the mitochondrion	1

Question Number	Answer	Mark
1(b)	C (S) A is not the answer as P is the cell membrane B is not the answer as Q is the cytoplasm D is not the answer as T is the nucleus	1

Question Number	Answer	Mark
1(c)	• structure / part of a cell with particular function / purpose / role (s) /eq (1)	1

Question Number	Answer	Additional guidance	Mark
1 (d)	An explanation that that makes reference to three of the following: • mitochondrion / U (1) • (mitochondrion) respiration / releases energy / provides ATP / eq (1) • flagellum / R / tail / eq (1)	No credit if U called cytoplasm/chloroplast P/Q/ R/ S/ T for respiration = no credit for mp 2 Ignore produces energy	3

Total 9 marks

Question Number	Answer	Mark
2(a)(i)	temperature/ 70°C / time / 5 mins / 5cm³ / volume of water / 5cm³ / volume of Benedict's / 5cm³ /volume of solution (1)	1

Question Number	Answer	Mark
2(a)(ii)	use water bath / beaker of water and Bunsen / eq (1)	1

Question Number	Answer	additional guidance	Mark
2(b)	An explanation that makes reference to four of the following 1. B (1) 2. (B) as has turned (brick) red (1) 3. (B) has <u>most</u> glucose / eq (1) 4. for respiration / eq (1) 5. provides / releases energy / for energy / ATP /eq (1) 6. for muscle <u>contraction</u> / eq (1) 7. can run faster / longer / eq(1)	If answers A C D can still score mp 4 5 6 NOT 2 3 7	4

Question Number	Answer	additional guidance	Mark
2(c)	An explanation that makes reference to two of the following • fewer calories / kilojoules / less energy / eq (1) • so less mass gain / may wish to lose weight / prevent obesity / heart disease / eq (1) • less tooth decay / diabetes / eq(1)	allow • some people may be diabetic (1) • increase blood glucose/ blood sugar / cannot release (enough) insulin / eq (1)	2

Total 8 marks

Question Number	Answer	Mark
3(a)	• light / sunlight / solar (1) • chemical (1)	2

Question Number	Answer	additional guidance	Mark
3(b)(i)	An explanation that makes reference to two of the following • keep in dark for 12/ 24 /48 hours /eq (1) • so all starch used up / eq (1) • in respiration (1)	Not just a while /some time No credit for no photosynthesis	2

Question Number	Answer	additional guidance	Mark
3(b)(ii)	• LHS outside flask black / blue / starch present / eq (1) • RHS inside flask yellow / orange / brown / no starch / eq (1)	If unlabelled allow LHS if shaded for one mark If starch and colour don't match no credit	2

Question Number	Answer	Additional guidance	Mark
3(c)	A description that includes • mineral 1 / eq (1) • function 1 / eq (1) • mineral 2 /eq (1) • function 2 / eq (1)	Can gain two for two correct mineral ions mineral with correct function not just for growth nitrate amino acids / proteins / enzymes / DNA magnesium chlorophyll / chloroplasts / photosynthesis iron chlorophyll / chloroplasts / photosynthesis /respiration phosphate DNA / ATP /cell membranes calcium cell walls/cell membranes potassium water balance / enzymes /photosynthesis /respiration Ignore phosphorous nitrogen but allow function So phosphorus for DNA scores one mark nitrogen for amino acids scores one mark	4

Question Number	Answer	Additional guidance	Mark
3(d)	An explanation makes reference to three of the following 1. active transport / eq (1) 2. no / less oxygen (in waterlogged / flooded soil) / eq (1) 3. no / less respiration / eq (1) 4. no / less energy / ATP / eq (1)	No credit for no air	3

Total 13 marks

Question Number	Answer	Additional guidance	Mark
4(a)(i)	Conversion 9000 (μm) (1) Division and evaluation $9000 \div 75 = 120$ (1) Or Conversion 0.075 (mm) (1) Division and evaluation $9 \div 0.075 = 120$ (1) Or Division $9 \div 75$ (1) Conversion and evaluation $\times 1000 = 120$ (1)	Correct answer with or without working gains full marks POT error = 1 mark as long as a division is shown in the working	2

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	• osmosis	Accept diffusion	1

Question Number	Answer	Additional guidance	Mark
4(a)(iii)	(aerobic) respiration	Do not credit anaerobic respiration	1

Question Number	Answer	Additional guidance	Mark
4(a)(iv)	active transport	Accept exocytosis	1

Question Number	Answer	Mark
4(b)	C (for movement of the contractile vacuole) A is incorrect because anaerobic respiration does not take place in mitochondria B is incorrect because osmosis / diffusion is passive D is incorrect because diffusion is passive	1

Question Number	Answer	Additional guidance	Mark
4(c)(i)	An answer that includes • scale half grid (at least 3 big squares) and linear (1) • straight lines dot-to-dot (1) • axes correct way round (mean rate of [contractile] vacuole emptying on y axis and %/percentage sodium chloride on x axis) (1) • units labelled on each axis (mean rate of [contractile] vacuole emptying on y axis and %/percentage sodium chloride on x axis) (1) • points correctly plotted within half a small square (1)	Need at least one zero Bar chart does not score L No L if extrapolated even if unlabelled Allow Y axis label without 'mean' only if have plotted 3 lines If non-linear scale between points no P No P if 3 lines	5

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	• (as concentration of sodium chloride increases) less water enters the amoeba / less osmosis in (to cell) / less water accumulates in contractile vacuole (1) • (because) sodium chloride solution has more solutes / has less water / has lower water potential / larger concentration gradient between cell and outside / eq (1)	ORA throughout Accept no water enters Accept descriptions of change to concentration gradient	2

Question Number	Answer	Additional guidance	Mark
4(d)	An answer that includes this: • (rate of emptying) is reduced / lower / eq (1) and one of: • less water enters because molecules have less (kinetic) energy (1) • less ATP / energy available due to lower rate respiration (1) • less / slower movement of contractile vacuole (1) • lower rate of, active transport / exocytosis (1)	Accept time for emptying vacuole is increased Accept less osmosis/diffusion of water into amoeba because less (kinetic) energy of molecules Accept lower rate respiratory enzyme action	2

Total for question 4 = 15 marks

Question Number	Answer	Additional guidance	Mark
5(a)(i)	$\frac{(1325.6 - 833.5)}{1325.6} \text{ or } 0.3712 \text{ (1)}$ $\times 100 \text{ or } 37.12 \text{ (1)}$ 37.1 (1) Or $833.3 \div 1325.6 \text{ or } 0.6286 \text{ (1)}$ $\times 100 \text{ or } 62.9 \text{ (1)}$ $(100 - 62.9 =) 37.1 \text{ (1)}$	Correct answer with no working gains full marks ECF for mp 2 and 3 provided they have used data from the table 37.2 = 2 marks (early rounding) 37.0 = 2 marks (early rounding)	3

Question Number	Answer	Additional guidance	Mark
5(a)(ii)	- bacteria, infect / kill / attacks / consume, the fungus - so no damage to peanut plants / plants can carry out more photosynthesis	Accept bacteria/bacillus is a pathogen of <i>A. niger</i> Accept less rotting	2

Question Number	Answer	Additional guidance	Mark
5(a)(iii)	Two from: <i>A. niger</i> has: nucleus (1) mitochondria (1) chitin in cell wall / does not have peptidoglycan in cell wall (1) no flagellum (1) no capsule (1) cells larger (1)	Allow ORA throughout Accept <i>Bacillus</i> has loop of DNA Accept <i>A. niger</i> has 80S/different ribosomes Accept other valid point e.g <i>A. niger</i> does not have plasmids	2

Question Number	Answer	Additional guidance	Mark
5(b)	• wear a mask / eq (1) • do not eat any peanuts / do not touch peanuts (and then touch mouth) / wear gloves / do not sell the peanuts / wash peanuts / sterilise peanuts / wash hands (1)	Ignore goggles	2

Question Number	Answer	Additional guidance	Mark
5(c)	C use at least two different humidities / moisture, in air levels / levels of watering (1) O same species / same type/ same fungus / age / size / condition / eq (1) R repeat / calculate mean / use more than one glasshouse / field/plot / lab (for each humidity) / eq (1) M1 measure % germination / % living crop plants / % crop loss/ (dry) mass of crop / % damaged stems or seed pods M2 stated time period (one week plus) / eq (1) S1 same light (intensity) / light duration / same sun(light) / same time of year / eq S2 same carbon dioxide concentration / mineral ions / soil / pH / temperature / eq (1)	No need to say how May relate to the fungus or the crop plant Need a how here ignore size ignore observe or measure infection Ignore water	6

Total for question 5 = 15 marks

Question Number	Answer	Additional guidance	Mark
6(a)	Two from • age / size /(surface) area / type / species of leaf / plant (1) • volume / concentration of (hydrogencarbonate) indicator solution (1) • (ambient) temperature / heat from lamp (1) • colour / wavelength of light (1)	Do not credit: distance of lamp / light intensity / carbon dioxide concentration / pH Ignore 'amount'	2

Question Number	Answer	Additional guidance	Mark
6(b)	An answer that makes reference to these three - as the distance away from the lamp increases, the light intensity decreases OR as distance from lamp decreases, light intensity increases (1) - as light intensity increases, the rate of photosynthesis increases OR as light intensity decreases the rate of photosynthesis decreases (1) - at distances smaller than 13 cm, there is no further increase in rate of photosynthesis / rate of photosynthesis is constant (1) plus one from - as light (intensity) increases (more) stomata open (1) - between 14 and 16 cm from lamp/eq, light is limiting the process / light is the limiting factor (1) OR at distances smaller than 13 cm another factor is limiting the process / in short supply / light is not the limiting factor (1) - example of another limiting factor – e.g. temperature or carbon dioxide concentration (1)	ORA Accept more energy trapped by chlorophyll If neither mp1 nor mp2 has been awarded, allow 'as distance increases rate of photosynthesis decreases', ORA Accept distances increasing 10 – 13 cm or test tubes 1 – 4 / first four tubes Accept tubes 1 to 4 / first four tubes	4

	• high light intensity is damaging the chlorophyll / chloroplasts (1) • leaf has lost water and cells cannot carry out photosynthesis (1)		
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Question Number	Answer	Additional guidance	Mark
6(c)	An answer that makes reference to three from • stomata to allow entry / exit of gases (1) • many (stomata) on underside of leaf / leaf has large area / leaf has broad shape (1) • leaf is thin so short diffusion distance (from stomata to palisade) (1) • air spaces in spongy layer / spongy mesophyll / behind stomata, so gases can diffuse (to palisade cells) / for gases to circulate (1) • thin cell walls allow entry/exit gases/named gases, (to/from cells) / allow gases to diffuse (1) • short distance to mitochondria / chloroplasts inside cells (1)	Accept named gas(es) Ignore 'for gas exchange' (repeats question) Ignore references to moisture	3

Total = 9 marks

Question Number	Answer	Additional guidance	Mark
7(a)(i)	trachea	Accept phonetic spelling Ignore windpipe/rings of cartilage	1

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	An answer that makes reference to any three from • (external) intercostal muscles relax so rib cage is lowered / eq OR internal intercostal muscles contract so rib cage is lowered / eq (1) • diaphragm relaxes / diaphragm domes / eq (1) • decreases volume in thorax / thoracic cavity / chest cavity (1) • increases pressure so air forced out / air rushes out / eq (1)	Accept moves up/raised Accept air moves out down pressure gradient / eq	3

Question Number	Answer	Additional guidance	Mark
7(b)(i)	Surface area of one alveolus $4 \times 3.142 \times (150)^2$ (1) Evaluation $282\,780 \text{ (}\mu\text{m}^2\text{)}$ (1) If use another value for pi e.g. 3.14 or 22/7 or 3.1428571... will get answers such as 282743.34..... or 282743.3388	Correct answer with or without working gains full marks If only awarding this mark they need a number for pi not just the symbol Accept 283 000 Accept numbers between 282743 and 282780 Accept any number that rounds up to 283 000 280 000 = 1 mark	2

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	Area of alveolus x number of alveoli $282\,780 \times 700 \times 10^6 \quad (1)$ Conversion to m² by division $\frac{282\,780 \times 700 \times 10^6}{1.0 \times 10^{12}} \quad (1)$ Evaluation 198 (m²) (1) Accept numbers between 197.9 and 198.1	Correct answer with or without working gains full marks Allow ecf up to full marks if using incorrect value from their calculation for 7 b i 1.97946×10^{14} Do not award if no area value Accept 197.946 or 197.95 (m²) or 197.9 (international candidates round up or down from 0.05) POT error = 2 marks BUT need to look at working – need to see conversion and must show division $1.97946 \times 10^{14} = 1 \text{ mark}$	3

Question Number	Answer	Additional guidance	Mark
7(c)	An answer that includes six from • each alveolus / alveoli have large surface area-to-volume ratio (because they are small) (1) • many alveoli give large surface area which increases rate of diffusion / increase rate of gas exchange (1) • alveoli surrounded by capillaries / good blood supply / rich blood supply / eq • thin alveoli walls / walls one cell thick/thin capillary walls (endothelium) / capillary walls one cell thick (1) • (so) short diffusion distance / short diffusion pathway pathway (1) • blood flow (in capillaries) maintains (steep) concentration gradient/ventilation maintains concentration gradient (1) • (alveoli are inside body so) warm/high temperature increases rate of diffusion (1) • because (gas/oxygen/carbon dioxide) molecules have more (K)E (1) • moisture (surfactant) prevents alveoli sticking together (which would reduce surface area) (1) • elasticity of alveoli walls/rings of cartilage to keep airways open (1)	Accept membrane/respiratory membrane for alveoli walls Accept oxygen carried away in blood/carbon dioxide removed by ventilation maintains concentration gradient Ignore references to gases having to be in solution/gases diffusing faster in solution	6

Total = 15 marks

Question Number	Answer	Additional guidance	Mark
8(a)(i)	ethanol (1) + carbon dioxide (1)	In either order Ignore 'alcohol' on its own Accept ethyl alcohol Ignore symbols	2

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	lactic acid / lactate (1)	Ignore energy/ATP Ignore any numbers Do not accept lactolate acid	1

Question Number	Answer				Mark
8(b)	Feature	Aerobic respiration only	Anaerobic respiration only	Both aerobic and anaerobic respiration	3 Ignore any ticks in first row If more than one box on a row is completed with a tick, do not credit that row Accept yes for tick Ignore x/no in other boxes
	produces ATP			✓	
	occurs in the mitochondria	✓			
	involves gas exchange between the cells and the blood	✓			
	produces an oxygen debt		✓		

Total = 6 marks

