



Mark Scheme (Results)

Summer 2025

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

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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 (prokaryote) <i>A is incorrect pneumococcus is not a eukaryote</i> <i>B is incorrect as pneumococcus is not a fungus</i> <i>D is incorrect as pneumococcus is not a protocist</i>	1

Question Number	Answer	Additional guidance	Mark
1(a)(ii)	pathogen / pathogenic / a pathogen / pathogens /pathogenicity	Accept phonetic spelling Ignore virus Ignore parasite	1

Question Number	Answer		Additional guidance		Mark
1(b)(i)					4
	feature	human lung cell	pneumococcus	influenza virus	
	ribosomes	✓	✓		
	cell membrane	✓	✓		
	cell wall		✓		
	nucleus	✓			
	protein coat			✓	
	plasmids		✓		
	1 mark per correct row				

Question Number	Answer	Mark
1(b)(ii)	C (DNA or RNA) <i>A is incorrect as viruses have one or the other</i> <i>B is incorrect as not all viruses have DNA</i> <i>D is incorrect as viruses have DNA or RNA</i>	1

Question Number	Answer	Additional guidance	Mark
1(b)(iii)	- an organism that lives in/on another living organism / eq (1) (an organism that) benefits (from the other organism) and causes harm (to the other organism)/eq (1)	Accept 'host / host cell' for other living organism Ignore depends on other organisms for survival unqualified for mp1 Ignore feeds off other organisms unqualified Accept answers in the context of viruses Accept examples of benefiting e.g. can only reproduce (inside host cell) Both ideas needed – parasite benefits and host is harmed /named example of harm e.g. pathogenic / eq	2

(Total for Question 1 = 9 marks)

Question Number	Answer	Mark
2(a)(i)	B (bronchiole) <i>A is incorrect as it is not an alveolus</i> <i>C is incorrect as it is not a bronchus</i> <i>D is incorrect as it is not a trachea</i>	1

Question Number	Answer		Mark
2(a)(ii)	An answer that makes reference to the following: it has more than one tissue / is a group of tissues / is a collection of tissues / made of multiple tissues / eq (1)		1

Question Number	Answer	Additional guidance	Mark
2(a)(iii)	An explanation that makes reference to the following: • diaphragm moves down / flattens / eq (1) • (chest / thorax) volume increases (1) • (chest / thorax) pressure decreases / air flows from high pressure to low pressure / down a pressure gradient / eq (1)	Ignore contracts as in q stem Ignore refs to ribs / other muscles / lungs	3

Question Number	Answer	Additional guidance	Mark
2(b)(i)	35 x 70 x 30 = 73 500 (cm³) (2) One mark for x 35 or x 70 or x 30 or 2450 or 1050 or 2100	Accept 74 000 or 73 000 for two marks Correct answer gains both marks	2

Question Number	Answer	Additional guidance	Mark
2(b)(ii)	An explanation that makes reference to three of the following: - oxygen use lower in smokers / lower rate of oxygen use / eq (1) - tar (in cigarettes) (1) - causes emphysema / mucus builds up / mucus not removed / cilia damaged / eq (1) - less <u>surface area</u> (of alveoli) / eq (1) - less <u>diffusion</u> of oxygen (into blood) (1) - carbon monoxide binds to haemoglobin (reducing oxygen) /eq (1) - causes narrowing of arteries / blocks blood vessels (reducing flow of oxygenated blood) / eq (1)	Accept less oxygen uptake / eq Accept converse Accept alveoli walls break down / deform / are damaged Ignore gas exchange Ignore veins	3

(Total for Question 2 = 10 marks)

Question Number	Answer	Mark
3(a)(i)	D (ribosome) <i>A is incorrect as cell membrane does not synthesise protein</i> <i>B is incorrect as mitochondrion does not synthesise protein</i> <i>C is incorrect as the nucleus does not synthesise protein</i>	1

Question Number	Answer	Mark
3(a)(ii)	C (mitochondrion, nucleus and ribosome) <i>A is incorrect as ribosomes are also present in both</i> <i>B is incorrect as nuclei are also present in both</i> <i>D is incorrect as mitochondrion is also present in both</i>	1

Question Number	Answer	Additional guidance	Mark
3(b)(i)	An explanation that makes reference to three of the following: 40 (: 1) (3) 62.5 for two marks OR 400(:1) for two marks OR 4(:1) for two marks $\div 1.2$ for one mark OR $\div 12$ for one mark OR $\div 0.12$ for one mark OR 6.25 for one mark	Example calculation: $75 \div 1.2 = 62.5$ $2500 \div 62.5 = 40$ Correct answer gains all three marks	3

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	An answer that makes reference to four of the following: 1. villus has high(est) number of mitochondria (per cell) / sperm has low(est) number of mitochondria (per cell) / eq (1) 2. sperm has high(est) number of mitochondria per $10\ \mu\text{m}^3$/ skin has low(est) number $10\ \mu\text{m}^3$/ eq (1) 3. mitochondria perform (aerobic) respiration / make ATP / release energy / eq (1) 4. villus (cells) do <u>active transport</u> (so need lot of energy) / eq (1) 5. sperm cells move / swim (so need lot of energy) / eq (1) 6. skin cells have few active processes / use little energy / eq (1)	Accept villus has many mitochondria (per cell) Accept sperm have few mitochondria (per cell) Accept sperm has many mitochondria per $10\ \mu\text{m}^3$/ skin has few mitochondria per $10\ \mu\text{m}^3$/ eq_(1) Accept volume or μm^3 for $10\ \mu\text{m}^3$ Accept sperm has highest concentration / density of mitochondria / skin has lowest concentration / density of mitochondria Ignore produce energy	4

(Total for Question 3= 9 marks)

Question Number	Answer	Additional guidance	Mark
4(a)(i)	• water / protein (1)	Accept amino acids	1

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	26 (2) One mark for correct answer to any number of decimal places e.g. 26.28571... OR One mark for $9.2 \div 35$ OR One mark for 0.26(28571)	Example calculation: $9.2/35 \times 100 =$ 26.28571 Correct answer gains both marks	2

Question Number	Answer	Additional guidance	Mark
4(a)(iii)	An answer that makes reference to one of the following: • helps peristalsis / eq (1) • prevents constipation / eq (1) • helps intestines push food / eq (1) • helps release faeces / eq (1) • helps egestion / eq (1) • helps in movement of food / eq (1)	Reject <u>excrete</u> faeces	1

Question Number	Answer	Additional guidance	Mark
4(b)	An answer that makes reference to three of the following: • <u>amylase</u> (1) • from salivary glands / from pancreas / eq (1) • starch / it, is digested into <u>maltose</u> (1) • <u>maltase</u> digests maltose (into glucose) (1)	Accept (released into / digested in) mouth Accept (released into / digested in) small intestine / duodenum / ileum Accept broken down / hydrolysed / turned into for digested	3

Question Number	Answer	Additional guidance	Mark
4(c)(i)	An answer that makes reference to the following: • 38 (mg per cm³) (1)		1

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	An answer that makes reference to the following order (lowest to highest): • orange - lemon (lime) - apple - grape (1)	Accept numbers from table i.e. 3 4 (lime = 7) 18 22	1

Question Number	Answer	Additional guidance	Mark
4(c)(iii)	An answer that makes reference to two of the following: • use a syringe / <u>graduated</u> pipette / measuring cylinder / burette / eq (1) • to measure volume / ml / cm³ / dm³ / mm³ / eq (1) • as drop sizes vary / masses of drops vary / volumes of drops vary / eq (1) • mix / swirl / stir (solution after adding drops) / eq (1)	Ignore references to repeats / replicates Ignore pipette alone Accept Automatic pipette Accept <u>volumetric</u> pipette Accept balance / scale Accept use titration Accept mass / weight (of juice) Accept idea that method does not control drop size	2

(Total for Question 4 = 11 marks)

Question Number	Answer	Additional guidance	Mark
5(a)	An answer that makes reference to four of the following: 1. (after 10 minutes) pH (in water) drops / becomes acidic (1) 2. lipase digests oil to fatty acids (and glycerol) (1) 3. fatty acids diffusing from tubing / into water (1) 4. because they are small(er) molecules (1) 5. (as time increases) pH drops more as more fatty acids leaving tubing (1) 6. After 20 minutes all oil digested or all fatty acids have diffused (into water), so no further drop in pH		4

Question Number	Answer	Additional guidance	Mark
5(b)	nitrogen	Accept chemical symbol Accept sulfur / S/ sulphur	1

Question Number	Answer	Additional guidance	Mark
5(c)(i)	R	Ignore Liver Accept lower case r	1

Question Number	Answer	Additional guidance	Mark
5(c)(ii)	1. emulsifies/eq fats / lipids (1) 2. so increases surface area (1) 3. more rapid lipase action / (1) 4. neutralises chyme/neutralises stomach contents	Accept Smaller droplets Reject smaller molecules Accept 'lipase works faster' Allow is alkaline so gives optimum pH for small intestine/ gives optimum pH for lipase/makes chyme alkaline	3

(Total for Question 5 = 9 marks)

Question Number	Answer	Additional guidance	Mark
6(a)	Left hand side $6\text{CO}_2 + 6\text{H}_2\text{O}$ (1) Right hand side $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ (1)	In any order In any order Accept $6\text{CH}_2\text{O}$ for hexose/glucose Reject any formulae with superscripts	2

Question Number	Answer	Additional guidance	Mark
6(b)	An answer that makes reference to four of the following: 1. wide/large (surface) area to absorb (a lot of) sunlight/light energy (1) 2. thin so short distance for diffusion (of gases/carbon dioxide) (1) 3. transparent cuticle to allow light to reach palisade cells (1) 4. air spaces to allow gases to circulate/eq (1) 5. xylem to bring water / phloem to carry away products of photosynthesis (1) 6. stomata for gaseous exchange (1) 7. many chloroplasts (for photosynthesis in mesophyll cells) (1) 8. other valid point e.g. thin cell walls so short diffusion distance (for carbon dioxide) Or palisade cells tightly packed for better light absorption Or large vacuole in mesophyll cells pushes chloroplasts to edge of cell	Allow transparent cell walls Allow gas exchange / diffusion Accept phloem carries away sugar/sucrose Accept a lot of chlorophyll	4

Question Number	Answer	Additional guidance	Mark
6(c)	Any six of the following: C use different temperatures (1) O same species/age/size/condition (1) R repeat/calculate mean at each temperature (1) M₁ measure the volume of oxygen evolved/count bubbles (1) M₂ in given time (1) S₁ same light intensity/wavelength (1) S₂ same carbon dioxide/concentration/mineral ion concentration/pH (1)	Reject one of the S marks if they give same temperature	6

(Total for Question 6 = 12 marks)

Question Number	Answer	Additional guidance	Mark
7(a)	Three from: 1. less chlorophyll / fewer chloroplasts (1) 2. less (sun)light (energy) trapped / eq(1) 3. (so) less photosynthesis /eq (1) 4. less glucose / starch made 5. (less glucose / starch for) cell division / respiration / growth / making other named relevant chemical (1)	Accept fewer leaves Accept no chloroplasts Accept damages chlorophyll / chloroplasts Ignore affects Accept no photosynthesis in context of a carbohydrate or lipids or amino acids or nucleic acids Ignore nutrients Ignore reduces yield	3

Question Number	Answer	Additional guidance	Mark
7(b)	Any two from: Plant cells have: • cellulose / walls (1) • chloroplasts (1) • large vacuole / permanent vacuole /eq (1) • plant cells store starch / animal cells store glycogen (1) • AVP e.g ref to no centrioles	ORA throughout Ignore chlorophyll Ignore 'vacuole' unqualified	2

Question Number	Answer	Additional guidance	Mark
7(c)	1. lack of magnesium (ions) / Mg^{2+} (1) 2. because magnesium is needed to make chlorophyll / eq (1) OR 3. lack of chlorophyll /chlorosis 4. because magnesium / nitrogen needed to make chlorophyll	Accept lack of nitrate / nitrogen /N (1) Accept (because nitrogen is needed to make chlorophyll / nitrogen needed for enzymes involved in making chlorophyll (1) If have scored nothing else award 1 for light needed to make chlorophyll	2

(Total for Question 7 = 7 marks)

Question Number	Answer	Additional guidance	Mark
8(a)(i)	An answer that makes reference to two of the following: 1. (undried foods) food contain water / are hydrated (1) 2. in varying/different, amounts (1) 3. (water content) gives false mass values /will change the mass /will affect the mass / eq (1)	Ignore references to easier to burn Ignore liquid/moisture Allow mp 2 and 3 in context of moisture/liquid	2

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	For standardisation / comparison / eq (1)	Ignore reference to calculating a mean	1

Question Number	Answer	Additional guidance	Mark
8(b)	One pair from first two pairs and another pair 1. insulate beaker / add lid / eq (1) 2. to reduce heat loss to surroundings / reduce heat transfer to surroundings (from water in beaker) / reduce heat loss from water to beaker (1) OR 3. insulation around burning food (1) 4. reduce heat loss to surroundings / reduce heat transfer to surroundings (from burning food) (1) AND 5. use temperature probe and data logger (1) 6. because thermometer is not a precision instrument (1) OR 7. have thermometer upright when reading temperature (1) 8. to prevent parallax errors (1) OR 9. use more sensitive balance (1) 10. to prevent errors in weighing/mass of food (1) OR 11. stir/stirrer (1) 12. to distribute heat / eq (1)	Accept prevent Accept prevent	4

Question Number	Answer	Additional guidance	Mark
8(c)	Two from: 1. pregnancy /breast feeding (1) 2. illness / wound repair / stress / inflammation (1) 3. levels of activity / metabolic rate / fitness level / eq (1) 4. age (1) 5. size / muscle mass (1)	Ignore lifestyle	2

(Total for question 8 = 9 marks)

Question Number	Answer	Additional guidance	Mark
9(a)	• it contains (many/different) cells that work together OR • contains (many/ different) cells that perform a function(s) / eq (1)		1

Question Number	Answer	Additional guidance	Mark
9(b)(i)	Answer 0.724 (mm²) (2) If answer incorrect look at working: (0.48)² = 1 mark 2.895... or 2.9 = 1 mark	Correct answer with or without working = 2 marks Accept 0.7239168 Accept 0.7 0.72 POT error = 1 mark	2

Question Number	Answer	Additional guidance	Mark
9(b)(ii)	Answer any number between 5.52 and 5.53 or 6 (2) $4 \div 0.724 = 1$ mark 1.38 or 1.39 = 2 marks	Correct answer with or without working = 2 marks Allow ECF from their answer to 9 b i POT error = 1 mark	2

Question Number	Answer	Additional guidance	Mark
9(b)(iii)	An answer that makes reference to three of the following: 1. allow oxygen in / allow carbon dioxide out for respiration (1) 2. allow carbon dioxide in / allow oxygen out for photosynthesis (1) 3. large number to increase rate of gas exchange (1) 4. open when exposed to light (1) 5. more on underside to reduce water loss (1)	If neither mp1 or 2 awarded give 1 mark for 'allow carbon dioxide and oxygen in or out'	3

Question Number	Answer	Additional guidance	Mark
9(c)	An explanation that makes reference to six of the following: <i>06:00 to 14:00</i> 1. high carbon dioxide (concentration) as not much light/dark and plants only respiring 2. (From 7 am) more light 3. so carbon dioxide decreases as plants begin to photosynthesis / more photosynthesis than respiration / eq (1) 4. stomata open (to take in carbon dioxide (1) 5. (also) temperature increasing so faster enzyme action / eq (1) 6. stays fairly level between 10:00 and 16:00 7. (because) light intensity high enough/any further increase in light intensity not making much difference / light intensity not a limiting factor / temperature may be too hot so enzymes not working so well / some stomata closed to prevent loss of water (1) 8. No other organisms (as soil sterilized) so changes only due to plants <i>14:00 to 22:00</i> 9. levels carbon dioxide rise as rate of photosynthesis is decreasing / eq (1) 10.(because) less light/getting dark (at 1800) / light is a limiting factor (1) 11.(18.00 to 6.00) dark/no light so rate respiration greater than rate photosynthesis /only respiration (1)	Max 4 for 6:00 to 14:00 Accept rate of respiration greater than rate of photosynthesis Accept sunup / daytime ORA for 1400 to 2200 Accept no photosynthesis	6

(Total for Question 9 = 14 marks)

