



Mark Scheme (Results)

Summer 2024

Pearson Edexcel International GCSE
In Biology (4BI1) Paper 1B

Question Number	Answer	Mark
1(a)(i)	<p>C (oak tree)</p> <p>A is not the answer as beetle is not the producer</p> <p>B is not the answer as deer is not the producer</p> <p>D is not the answer as tick is not the producer</p>	1

Question Number	Answer	Additional guidance	Mark
1(a)(ii)	oak / tree → caterpillar → mouse → tick (2)	Allow 1 for correct order. No credit for pyramids	2

Question Number	Answer	Mark
1(a)(iii)	<p>D (mouse)</p> <p>A is not correct as the ant is not at two levels</p> <p>B is not correct as the blue jay is not at two levels</p> <p>C is not correct as the caterpillar is not at two levels</p>	1

Question Number	Answer	additional guidance	Mark
1(b)(i)	<p>Calculation method not marking points</p> <p>Measurement of line 10.4 cm / 104 mm</p> <p>Measurement of line ÷ 3.5mm</p> <p>= 29-30 (2)</p> <p>Correct answer = 2 marks</p>	<p>allow 1 mark for correct measurement of line 10.3-10.5cm or 103-105 mm with units</p> <p>or allow 1 mark for dividing by 3.5 or 35</p> <p>allow range 29.0 - 30.0 for 2 marks</p>	2

Question Number	Answer	Additional guidance	Mark
1(b)(ii)	<p>An explanation makes reference to four of the following:</p> <ul style="list-style-type: none"> • substance 1 (1) • required for function 1 (1) • substance 2 (1) • required for function 2 (1) 	<p>Function must match substance not credit for function alone</p> <p>Naming two correct substances gains 2 marks</p> <p>ignore blood cells / platelets / oxygen / hormones / antibodies / enzymes</p> <p>allow named vitamin / or vitamins / for one mark</p> <p>minerals / named mineral for one mark</p> <p>examples</p> <p>allow glucose (1)</p> <p>for energy / respiration (1)</p> <p>Iron (1)</p> <p>for haemoglobin / red blood cells / eq (1)</p> <p>allow amino acids (1)</p> <p>for protein (synthesis) / eq (1)</p> <p>allow proteins / named protein / eq</p> <p>for growth / eq (1)</p> <p>allow cholesterol / fatty acids / lipoproteins / eq (1)</p> <p>for energy / insulation / eq (1)</p> <p>allow water (1)</p> <p>for keeping body hydrated/ transport /as solvent / eq (1)</p> <p>allow Vitamin C (1)</p> <p>for prevents / scurvy /eq (1)</p>	4

Question Number	Answer	additional guidance	Mark
1(b)(iii)	<p>An answer that makes reference to two of the following:</p> <ul style="list-style-type: none"> • tick picks up / bites / sucks up / absorbs blood from infected animal / animal with disease / eq (1) • bacteria / virus / pathogen / eq (1) • feed / bite / (new / uninfected) other animal /eq (1) 	<p>Allow transfer if ref to biting in answer</p>	2

total 12 marks

Question Number	Answer	Mark
2(a)(i)	<p>B (Q)</p> <p>A is not the answer as P is not the style</p> <p>C is not the answer as S is not the style</p> <p>D is not the answer as T is not the style</p>	1

Question Number	Answer	Mark
2(a)(ii)	<p>D (U)</p> <p>A is not the answer as P does not release pollen</p> <p>B is not the answer as R does not release pollen</p> <p>C is not the answer as T does not release pollen</p>	1

Question Number	Answer	Mark
2(a)(iii)	<p>A (P)</p> <p>B is not correct as pollen grains do not germinate on R</p> <p>C is not correct as pollen grains do not germinate on S</p> <p>D is not correct as pollen grains do not germinate on U</p>	1

Question Number	Answer	Mark
2(b)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none"> • P feathery / large surface area / outside flower /exposed / eq (1) • R absent / smaller / not coloured / green / eq (1) • T longer / hinged / outside flower / exposed / eq (1) 	3

Question Number	Answer	Mark
2(c)(i)	<ul style="list-style-type: none"> • runners / bulbs / corms/ tubers / rhizomes /eq (1) 	1

Question Number	Answer	additional guidance	Mark
2(c)(ii)	<ul style="list-style-type: none"> • cuttings / grafting / layering / tissue culture / micropropagation / eq (1) 	Reject cloning	1

Question Number	Answer	additional guidance	Mark
2(d)	<p>An answer that makes reference to the following:</p> <p>Allow two / three in one numbered line</p> <ul style="list-style-type: none"> no gametes produced in asexual / no meiosis in asexual / gametes produced in sexual / meiosis in sexual / one parent <u>cell</u> (1) no fusion or fertilisation in asexual / present in sexual (1) offspring are clones / show no genetic variation in asexual / genetic variation in sexual /eq (1) asexual faster / shorter time / sexual slower / longer time / eq (1) 	<p>Only mitosis in asexual</p> <p>ignore ref to number of parents</p> <p>sexual involves fusion of gametes scores mp 1 and mp 2</p>	3

Question Number	Answer	additional guidance	Mark
2(e)	<p>An explanation makes reference to three of the following:</p> <ul style="list-style-type: none"> selective breeding / artificial selection (1) cross red (flower)/ unscented (flower) with white (flower) / scented (flower)/ eq (1) select / breed / offspring with red and scent /eq (1) repeat / for many generations eq (1) 	<p>Ignore ref to GM as it is the farmer</p> <p>Cross varieties / the plants</p> <p>ignore desired characteristics alone</p>	3

total 14 marks

Question Number	Answer	additional guidance	Mark
3	<ul style="list-style-type: none"> • milk (1) • pasteurisation / sterilisation (1) • killed (1) • <i>Lactobacillus</i> / <i>Streptococcus</i> (1) • lactose (1) • anaerobic (1) • lactic acid / lactate (1) 	allow dead / destroyed	7

total 7 marks

Question Number	Answer	additional guidance	Mark
4(a)	$\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \longrightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} \text{ (2)}$	Unbalanced but correct symbols scores 1 No credit for word equation	2

Question Number	Answer	Additional guidance	Mark
4(b)(i)	An explanation that makes reference to two of the following <ul style="list-style-type: none"> • bubble would not move / CO₂ also moves / shifts bubble /eq (1) • carbon dioxide is produced / released /eq (1) • (only) oxygen consumption measured / eq (1) 	not just CO ₂ present	2

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	<ul style="list-style-type: none"> • water bath / eq (1) 	Allow description of beaker filled with water and Bunsen Ignore Bunsen alone	1

Question Number	Answer	additional guidance	Mark
4(c)(i)	Calculation method not marking points $22 + 25 + 24 = 71$ $71 \div 3$ $= 24 (2)$	Allow 1 mark for 71 or $\div 3$ or 23.7/ 23.67/ 23.6 recurring	2

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	An explanation that makes reference to three of the following: <ul style="list-style-type: none"> • increases (kinetic) energy of molecules / molecules move faster / eq (1) • collide more frequently / form more enzyme substrate complexes/eq (1) • respiration (rate) increases / eq (1) • more oxygen consumed / oxygen used faster/ eq (1) • ref to/ nearer to optimum temperature for <u>enzymes</u> / eq (1) 	not energy of bubble no credit for increased movement of bubble	3

total 10 marks

Question Number	Answer	Mark
5(a)(i)	<p>C (1,2 and 4 only)</p> <p>A is not correct as water vapour is a greenhouse gas</p> <p>B is not correct as oxygen is not a greenhouse gas and water vapour is a greenhouse gas</p> <p>D is not correct as oxygen is not a greenhouse gas</p>	1

Question Number	Answer	Mark
5(a)(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • IR / long wave radiation is absorbed / traps IR / long wave radiation / traps heat / prevents heat escaping / eq (1) • (so) increases (global) temperature / earth warms / global warming /eq (1) 	2

Question Number	Answer	Additional guidance	Mark
5(b)(i)	<p>Calculation method not marking points</p> <p>readings = agriculture 50, energy 110, business 118, transport 175</p> <p>adding together $50 + 110 + 118 + 175 = 453$</p> <p>% energy = $(110 \div 453) \times 100$</p> <p>= 24% (3) allow range 23.9-24.9</p>	<p>23.9-24.9= 3 marks</p> <p>Full marks for answer no working / wrong working</p> <p>If not correct answer</p> <p>allow 1 mark for all correct readings even if unlabelled (+/- 1)</p> <p>allow 1 mark for dividing 110 (109-111) by their total</p>	3

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	<p>An answer that makes reference to five of the following:</p> <ol style="list-style-type: none"> 1. overall emissions fall / less mass / eq (1) 2. energy most in 1990 / falls the most / (large) fall in energy /eq(1) 3. energy now generated by wind / solar / less from coal / gas power stations / less burning of fossil fuels/ eq (1) 4. transport increases / increases then falls / transport falls from 2009 / 2010 / eq (1) 5. more cars / more emissions / (then) change to / more electric / hybrid cars / less travelling to work / eq (1) 6. agriculture drops / eq (1) 7. less cattle farmed / less methane released / eq (1) 8. business little change / drops slightly / eq (1) 	<p>allow all fall after 2020</p> <p>allow more renewable energy</p> <p>allow transport drops after 2020</p> <p>allow drops after 2020</p>	5

total 11 marks

Question Number	Answer	Mark
6(a)(i)	<p>B (oxygen)</p> <p>A is not the answer as carbon dioxide is not released</p> <p>C is not the answer as methane is not released</p> <p>D is not the answer as nitrogen is not released</p>	1

Question Number	Answer	Mark
6(a)(ii)	<p>A (chloroplast)</p> <p>B mitochondrion is not the site of photosynthesis</p> <p>C nucleus is not the site of photosynthesis</p> <p>D ribosome is not the site of photosynthesis</p>	1

Question Number	Answer	Mark
6(a)(iii)	<ul style="list-style-type: none"> temperature / carbon dioxide concentration / pH / background light / same bulb/ lamp / time period / eq (1) 	1

Question Number	Answer	additional guidance	Mark
6(b)(i)	<p>An answer that refers to the following</p> <ul style="list-style-type: none"> • scale linear and plot half grid on y (1) • lines straight and through points (1) • axis correct way around (distance on x axis) (1) • points correctly plotted (1) • units distance from lamp in cm and bubbles per minute (1) 	<p>at least 2.5 large square on y</p> <p>No P if all 3 lines plotted No P if extrapolate rate to 0</p> <p>Max 4 for bar chart No L</p>	5

Question Number	Answer	additional guidance	Mark
6(b)(ii)	<p>An explanation that refers to three of the following</p> <ul style="list-style-type: none"> • as distance increases rate falls / fewer bubbles / eq (1) • as light intensity reduces / less light energy / light becomes limiting factor (1) • slower rate of / less photosynthesis (1) • less <u>oxygen</u> released / fewer <u>oxygen</u> bubbles released (1) 	<p>Mp1 No credit for converse</p> <p>Allow converse for mp 2 and mp 3</p> <p>Not just less light</p> <p>Mp4 No credit for converse</p>	3

total 11 marks

Question Number	Answer	Additional guidance	Mark
7(a)	<p>An answer that refers to three of the following</p> <ul style="list-style-type: none"> • red cell has no nucleus eq (1) • red cell biconcave disc / eq (1) • red cell small(er) /eq (1) • red cell contains haemoglobin / eq (1) 	<p>white cell has nucleus</p> <p>white cell not biconcave / irregular shape</p> <p>white cell large(r)</p> <p>white cell no haemoglobin</p>	3

Question Number	Answer	additional guidance	Mark
7(b)(i)	<p>Calculation method not marking points</p> <p>4.3×5.2</p> <p>$= 22.36$</p> <p>22.4×10^{12}</p> <p>2.2×10^{13} (3)</p>	<p>Allow 1 mark for $\times 5.2$</p> <p>Allow 2 mark for 22.4×10^{12} or 22.36×10^{12} for correct answer but not in correct standard form</p> <p>allow full marks for 2.236×10^{13} 2.24×10^{13}</p>	3

Question Number	Answer	additional guidance	Mark
7(b)(ii)	<p>Calculation method not marking points</p> <p>$151 - 148 = 3$</p> <p>$(3 \div 148) \times 100$</p> <p>$= 2.03\%$ (2)</p>	<p>Allow 1 mark for 3 or 151 -148</p> <p>Allow 2.027 / 2.027027 etc</p>	2

Question Number	Answer	additional guidance	Mark
7(b)(iii)	<p>An answer that makes reference to five of the following:</p> <ol style="list-style-type: none"> 1. large numbers / study / reliable results / eq (1) 2. fewer people in study / lower numbers at altitude than sea level /eq(1) 3. more women than men / eq (1) 4. no information on age /health / body mass / eq (1) 5. Hb increases from 0 to 1890 / from 0 to 2270 / with altitude eq (1) 6. (as) more red cells (produced) (at 1890) (at 2270) / eq (1) 7. as less partial pressure of oxygen / less (availability of) oxygen / eq (1) 8. to enable oxygen transport / uptake / aerobic respiration / eq (1) 9. little change in Hb / (slight) reduction from 1890 to 2270 / eq (1) 10.as small(er) increase in altitude / eq (1) 11. drop in red cells from 1890 to 2270 / eq (1) 12. men have more Hb/ more red cells (at every altitude) than women / eq (1) 	<p>allow lower oxygen concentration</p> <p>allow for gas exchange</p>	5

total 13 marks

Question Number	Answer	Mark
8(a)	<ul style="list-style-type: none"> an allele that is only expressed in the homozygote / only in phenotype of homozygote / only shown in (phenotype) if two copies/ needs two copies to be expressed / not expressed in the heterozygote / not expressed if dominant allele present / not always expressed / eq (1) 	1

Question Number	Answer	additional guidance	Mark
8(b)(i)	<p>An answer that includes</p> <p>A Ff / heterozygous (1)</p> <p>B Ff / heterozygous (1)</p> <p>C ff / <u>homozygous recessive</u> (1)</p>	Allow other symbols	3

Question Number	Answer	additional guidance	Mark
8(b)(ii)	<p>An answer that includes the following:</p> <ul style="list-style-type: none"> Ff and Ff (1) F and f (1) <ul style="list-style-type: none"> FF Unaffected Ff Unaffected (x2) (Ff) ff affected 1 / allow correct phenotype ratio (1) 	<p>Allow from Punnett square</p> <p>If correct gametes and offspring from incorrect parents allow TE 1 max</p> <p>Allow any letters so long as genetics correct ignore X and Y but allow X and x or Y and y</p> <p>Must have genotypes and phenotypes</p>	3

Question Number	Answer	additional guidance	Mark
8(c)(i)	<p>An explanation that refers to three of the following</p> <ul style="list-style-type: none"> • pancreas produces / releases amylase / proteases / lipases / eq (1) • no / less digestion of starch to maltose /eq (1) • no / less digestion of proteins to amino acids / (poly)peptides to amino acids /eq (1) • no / less digestion of lipid to fatty acids and glycerol (1) • less absorption of smaller molecules / soluble molecules / amino acids / glucose / fatty acids / eq (1) 	<p>allow 1 mark for less digestion / break down as fewer enzymes released only if mp 2 or 3 or 4 not awarded</p>	3

Question Number	Answer	Additional guidance	Mark
8(c)(ii)	<p>An explanation that refers to two of the following</p> <ul style="list-style-type: none"> • reduce likelihood of pregnancy / less likely to conceive / eq (1) • sperm / semen cannot enter <u>fallopian tube</u> / <u>oviduct</u> 1) • <u>fertilisation</u> less likely / no <u>fertilisation</u> / <u>fusion</u> (of gametes) (1) 	<p>Ignore no / less reproduction</p>	2

total 12 marks

Question Number	Answer	additional guidance	Mark
9(a)(i)	<p>An answer that makes reference to two of the following:</p> <ul style="list-style-type: none"> • sunlight / light / eq (1) • volume /mass of solution / eq (1) • number of plants / number of leaves / size of leaves / size of plant /health of leaves (at start)/ eq(1) • same species / use duckweed /eq (1) • time / duration/ eq (1) • all jars covered /eq (1) 	<p>Not temperature</p> <p>not amount of solution</p> <p>allow amount of leaves</p>	2

Question Number	Answer	additional guidance	Mark
9(a)(ii)	<p>An explanation that makes reference to two of the following:</p> <ul style="list-style-type: none"> • it (complete solution) (contains all minerals) so produces normal growth / ideal growth / eq (1) • distilled water contains no minerals / plant would be lacking all minerals / would not grow normally /eq (1) • so any difference in growth due to missing one mineral / eq (1) 		2

Question Number	Answer	additional guidance	Mark
9(a)(iii)	An explanation that makes reference to two of the following: <ul style="list-style-type: none"> • photosynthesis /eq (1) • to produce glucose (for respiration) / eq (1) • for growth / to allow normal growth / eq (1) 		2
Question Number	Answer		Mark
9(a)(iv)	<ul style="list-style-type: none"> • mineral that is missing / absent from solution / minerals present / composition of solution / solution / eq (1) 		1

Question Number	Answer	Mark
9(b)(i)	<ul style="list-style-type: none"> • (quantitative / number of leaves) uses number / is measured / counted / and (qualitative / size of leaf) is a type / category / uses words / observed / subjective /opinion / eq (1) 	1

Question Number	Answer	additional guidance	Mark
9(b)(ii)	<p>An answer that makes reference to 6 of the following:</p> <ol style="list-style-type: none"> 1. complete / no minerals lacking/ A have most leaves / largest leaves / eq(1) 2. complete / no minerals lacking / A have dark green / greenest leaves /eq (1) 3. minus nitrate / B have few / least / smaller / smallest leaves / less green /yellow/ eq (1) 4. nitrate required for amino acid / protein / chlorophyll / chloroplasts / nitrate required for growth /eq (1) 5. minus magnesium / C have few / smaller / less green / yellow / eq (1) 6. magnesium required for chlorophyll / chloroplasts / photosynthesis /eq(1) 7. minus iron / D have few / smaller leaves / less green / least green / yellow / eq (1) 8. iron required for chlorophyll /chloroplasts / photosynthesis / eq (1) 9. Not repeated / not reliable / few plants used / eq (1) 	<p>allow iron required for respiration</p>	6

total 14 marks

Question Number	Answer	additional guidance	Mark
10	<p>An answer that makes reference to six of the following:</p> <p>C use glasshouses with three or more concentrations / levels / amounts of carbon dioxide / eq (1)</p> <p>O use crop plants of same species eq/ (1)</p> <p>R repeat each concentration /eq (1)</p> <p>M1 measure mass / kg / amount of seeds / number of leaves / fruit / size (of leaves) / eq (1)</p> <p>M2 after stated time / eq (1)</p> <p>S1 temperature / (sun)light / same season / eq (1)</p> <p>S2 same soil / water / humidity / fertiliser / minerals/ pH/ eq (1)</p>	<p>at least 3 concentrations of CO₂ use 3 different conc. OK the conc. don't need to be stated allow high / medium /zero</p> <p>Not yield alone not height</p>	6

total 6 marks