



Mark Scheme (Results)

January 2022

Pearson Edexcel International GCSE
In Biology (4BI1) Paper 2BR

Question Number	Answer	additional guidance	Mark
1 (a)	<p>An explanation that makes reference to two of the following:</p> <ul style="list-style-type: none"> • (two) different parent plants / cross with another plant / eq (1) • (produce different) gametes (1) • parent plants /gametes have different genotypes / alleles / genes / genetic material / DNA / eq(1) • (gametes) fuse / combine / fertilisation (1) 	allow other flower	2

Question Number	Answer	additional guidance	Mark
1 (b)(i)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • less competition for light / get enough / sufficient / more light / eq (1) • less competition for water / get enough / sufficient water / more water eq (1) • less competition for minerals / named mineral / get enough / sufficient minerals/ more minerals /eq (1) 	<p>allow one mark for less competition unqualified</p> <p>ignore space / CO₂</p>	3

Question Number	Answer	Mark
1 (b)(ii)	<ul style="list-style-type: none"> • can grow in suitable / same conditions / habitat as parent (which successfully grew there) / has plant to <u>cross-pollinate</u> with / eq (1) 	1

Question Number	Answer	additional guidance	Mark
1 (c)	An explanation that makes reference to three of the following: <ul style="list-style-type: none"> warmth / optimum temperature for enzyme action / increased temperature for chemical reactions / eq (1) water to mobilise enzymes / for chemical reactions / eq (1) oxygen for respiration / eq (1) light to stimulate growth / break dormancy / eq (1) 	must have factor and reason not light for photosynthesis	3
Question Number	Answer	additional guidance	Mark
1 (d)	An explanation that makes reference to two the following: <ul style="list-style-type: none"> (bright colours to) attract animals / humans / easily seen / eq (1) to eat the fruits / consume / eq (1) as they contain glucose / sugars / eq (1) 	ignore attract insects	2

Question Number	Answer	additional guidance	Mark
1 (e)	An answer that makes reference to : <ul style="list-style-type: none"> from fruit eaten and egested by/ passed through humans / from faeces / seeds not digested /eq (1) 	no credit for more nitrates / minerals	1

Question Number	Answer	additional guidance	Mark
1 (f)	An answer that makes reference to : <ul style="list-style-type: none"> heat / warmth / high temperature (for evaporation) / dries out (tissue)/ eq (1) 	not just evaporation of water	1

Question Number	Answer	Mark
1 (g)	<p>A description that makes reference to three of the following:</p> <ul style="list-style-type: none"> • use watch / clock / measure record to time fall (1) • from same height (1) • repeat / calculate mean time (1) • use same mass seeds / same seeds / same species / eq (1) • with and without fluff / different amounts of fluff/ eq (1) 	3

total 16 marks

Question Number	Answer	Mark
2(a)(i)	<p>The only correct answer is</p> <p>D S glomerulus</p> <p>A is not the answer as P is the distil convoluted tubule</p> <p>B is not the answer as Q is the collecting duct</p> <p>C is not the answer as R is the loop of Henle</p>	1

Question Number	Answer	Mark
2(a)(ii)	<p>The only correct answer is</p> <p>D U the PCT</p> <p>A as Q is the collecting duct</p> <p>B is not the answer as R is the loop of Henle</p> <p>C is not the answer as S is the glomerulus</p>	1

Question Number	Answer	Mark
2(a)(iii)	<p>The only correct answer is</p> <p>B structure R is the loop of Henle</p> <p>A is not the answer as P is the distil convoluted tubule</p> <p>C is not the answer as S is the glomerulus</p> <p>D is not the answer as U is the proximal convolute tubule</p>	1

Question Number	Answer	additional guidance	Mark
2(b)(i)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> substances / chemicals present / in solution/ dissolved / carried in the liquid part of the blood / substances / chemicals / present / in solution/ dissolved / carried in the plasma / eq (1) 	no credit for components	1

Question Number	Answer	additional guidance	Mark
2(b)(ii)	<p>$56 / 100 \times 54$</p> <p>$= 30 (2)$</p>	<p>allow 30.2 / 30.24 (2)</p> <p>allow full marks for correct answer alone</p> <p>allow 1 mark for 56 or 1 mark for</p> <p>$54 - (54 \times 44 / 100)$</p>	2

Question Number	Answer	Mark
2(b)(iii)	<p>An explanation that makes reference to two the following:</p> <ul style="list-style-type: none"> • (so that) glucose not excreted / lost from body / eq (1) • maintain blood glucose / eq (1) • (required for) respiration / (release of) energy / eq (1) 	2

Question Number	Answer	Mark
2(b)(iv)	<p>An answer that makes reference to five of the following:</p> <ul style="list-style-type: none"> • 1 as water potential of blood decreases / (solute / solution) concentration increases /eq(1) • 2 osmoreceptors / hypothalamus /pituitary glands (1) • 3 (more) ADH secreted (1) • 4 increase permeability of collecting duct / eq (1) • 5 more water (re)absorbed / less excreted / less urine /more concentrated urine / eq(1) • 6 more urea produced / concentration increases /eq (1) • 7 less urea reabsorbed / more urea excreted / more in urine / eq (1) • 8 more sodium / salts in plasma /eq (1) • 9 so more salt / sodium excreted / less reabsorbed / more in urine / eq(1) • 10 more glucose in blood/ filtered but no change as all reabsorbed / none excreted / eq (1) 	5

total 13 marks

Question Number	Answer	Mark
3(a)	W nucleus / eq (1) X cell sap / vacuole / eq (1) Y cellulose cell wall / cell wall / eq (1) Z cytoplasm (1)	4

Question Number	Answer	Additional guidance	Mark
3(b)	An answer that makes reference to two the following: measure distance A-B 80 mm 8.0 cm = 80 000 μm magn = 80 000 \div 1000 80 or 79 or 81 or 82 (2) or A-B 8 cm = 8 \times 10000	allow full marks for correct answer alone allow 1 mark for $\times 1000 \div 1000$ if mm or $\times 10000 \div 1000$ if cm or for correct length of AB from diagram with units range 79-82 mm 7.9-8.2 cm	2

Question Number	Answer	Mark
3(c) (i)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> • increases surface area (1) • osmosis (1) • (water in) root hair cell has lower water potential (than water in soil) / from high to low water potential from dilute to more concentrated solution / eq (1) • as water is lost from leaves/ stomata reducing / setting up osmotic gradient/ water potential gradient in plant /eq (1) • for photosynthesis / turgor/ eq (1) • to transport / absorb mineral ions / eq (1) 	<p>3</p> <p>allow correctly expressed idea of conc gradient</p>

Question Number	Answer	Mark
3(c) (ii)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> • (no / less) oxygen / eq (1) • (no / less) respiration / eq (1) • (no / less) active transport / eq (1) • (no / less) absorption of minerals /named mineral /eq (1) • (no / less) nitrates for amino acids / for protein synthesis / no magnesium for chlorophyll synthesis / eq (1) 	<p>3</p>

total 12 marks

Question Number	Answer	Mark
4(a)	<p>A denitrification / denitrifying (bacteria)(1)</p> <p>B nitrification / nitrifying (bacteria) (1)</p> <p>C nitrogen fixation / nitrogen fixing (bacteria) (1)</p>	3

Question Number	Answer	additional guidance	Mark
4(b)(i)	$120 + 58 + 5 + 70 = 253$ 253×10^{12} 2.53×10^{14} (2)	full marks for correct answer allow 1 for 2.53 or 253 253×10^{12} scores 1	2

Question Number	Answer	additional guidance	Mark
4(b)(ii)	$40 + 100 + 60 + 5 = 205$ $40 / 205 \times 100$ 20% or 19.5 or 19.51 or 19.512 etc (2)	full marks for correct answer allow 1 for 205	2

Question Number	Answer	Mark
4(b)(iii)	An explanation that makes reference to two of the following: <ul style="list-style-type: none"> • (biomass) contains proteins / amino acids / DNA / RNA / nucleic acids / eq (1) • N containing <u>compounds</u> (1) • produce nitrous oxides / oxides of nitrogen when burned / eq (1) 	2

Question Number	Answer	additional guidance	Mark
4(c)	<p>An explanation that makes reference to two of the following:</p> <ul style="list-style-type: none"> • (nitrous oxide is a) greenhouse gas (1) • trap heat in atmosphere / absorbs IR radiation / prevents IR radiation escaping / eq (1) • increases / causes global warming (1) 	<p>not just heats up earth / atmosphere</p> <p>not just increases temp</p>	2

total 11 marks

Question Number	Answer	additional guidance	Mark
5(a)	<p>An answer that makes reference to 5 of the following points.</p> <p>fish caught / traditional fishing graph 1</p> <ul style="list-style-type: none"> • 1 increased (in all countries) (1) • 2 increased by almost same proportion in each country (1) <p>fish farming graph 2</p> <ul style="list-style-type: none"> • 3 increase in farming (in all countries) (1) • 4 increased most in A (1) • 5 higher growth in C than B (1) <p>comparison</p> <ul style="list-style-type: none"> • 6 more tonnes from farming / graph 2 than catching in A / more tonnes from farming / graph 2 than catching in C / less in B (1) • 7 A has the highest for both (caught and farmed) / eq (1) <p>other</p> <ul style="list-style-type: none"> • 8 no information on fish species / type of fish (1) • 9 no information on sustainability / fish supply /eq (1) • 10 data not expressed as per capita /eq (1) 		5

Question Number	Answer	Additional guidance	Mark
5(b)	<p>An explanation that that makes reference to five of the following points:</p> <ul style="list-style-type: none"> • separate different species to prevent predation / use nets to prevent predation / eq (1) • separate different sizes / ages to prevent predation / eq (1) • feed protein rich food / feed (frequently) in small quantities (to prevent accumulation of waste) / eq (1) • use antibiotics / fungicides to reduce disease eq (1) • (filter water to) remove faeces / waste / algae / remove dead fish / eq (1) • aerate water / use pumps to maintain oxygen levels / eq (1) • use selective breeding / GM (to maximise yield) /eq 	<p>not just control diet unqualified</p> <p>not just clean the water unqualified</p>	5

total 10 marks

Question Number	Answer	additional guidance	Mark
6 (a)	<ul style="list-style-type: none"> • salt <u>concentration</u> / <u>concentration</u> of salt (solution) /sodium chloride <u>concentration</u> / <u>percentage</u> sodium chloride / <u>percentage</u> salt solution / <u>water potential</u> of solution / eq (1) 	<p>must have concentration , percentage or water potential</p> <p>not just salt solution</p>	1

Question Number	Answer	additional guidance	Mark
6(b)	<ul style="list-style-type: none"> • volume of (diluted) blood / volume of solution / time solution left for / concentration of (diluted) blood sample / concentration of blood plasma / eq 	<p>not volume of water ignore amount</p>	1

Question Number	Answer	Mark
6(c)(i)	<p>An explanation that makes reference to two of the following :</p> <ul style="list-style-type: none"> • no cells in distilled water / A / cells burst / explode / eq (1) • haemoglobin dissolves / eq (1) • cells in present / cells unchanged in other B / 1% / c? 3% /eq(1) 	2

Question Number	Answer	Mark
6(c)(ii)	<p>An explanation that makes reference to two the following:</p> <ul style="list-style-type: none"> • water enters red cells in A distilled water / eq (1) • water enters and leaves / no movement in B 1% / eq (1) • water leaves red cells in C 3% / eq (1) • (due to) osmosis (1) 	2

Question Number	Answer	additional guidance	Mark
6(d)	<p>An description that makes reference to the following:</p> <ul style="list-style-type: none"> • Tube A no red cells (layer) / no bottom layer / red colour throughout tube / more 'plasma' / no platelets / no separation into layers / no layers / no cell layers / eq (1) • Tube B / C normal cell layers / normal (layer) of red cells / eq (1) 	allow slightly fewer red cells / smaller layer in C than normal	2

total 8 marks