Mark Scheme (Results)

January 2022

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

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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	additional guidance	Mark
1 (a)	An explanation that makes reference to two of the following: • (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)	An explanation that makes reference to the following: • 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)	allow one mark for less competition unqualified ignore space / CO_2	**3**

Question Number	Answer	Mark
1 (b)(ii)	• 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: • 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: • (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 : • 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 : • heat / warmth / high temperature (for evaporation) / dries out (tissue)/ eq (1)	not just evaporation of water	**1**

Question Number	Answer	Mark
1 (g)	A description that makes reference to three of the following: • 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)	The only correct answer is **D** S glomerulus **A** is not the answer as P is the distil convoluted tubule **B** is not the answer as Q is the collecting duct **C** is not the answer as R is the loop of Henle	**1**

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

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

Question Number	Answer	additional guidance	Mark
2(b)(i)	An answer that makes reference to the following: • 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)	56 / 100 x 54 = 30 (2)	allow 30.2 / 30.24 (2) allow full marks for correct answer alone allow 1 mark for 56 or 1 mark for 54 – (54 x 44 / 100)	**2**

Question Number	Answer	Mark
2(b)(iii)	An explanation that makes reference to two the following: • (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)	An answer that makes reference to five of the following: • 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 ÷ 1000 80 or 79 or 81 or 82 (2) or A-B 8 cm = 8 × 10000	allow full marks for correct answer alone allow 1 mark for ×1000÷1000 if mm or ×10000÷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)	An explanation that makes reference to three of the following: • 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)	**3** allow correctly expressed idea of conc gradient

Question Number	Answer	Mark
3(c) (ii)	An explanation that makes reference to three of the following: • (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)	**3**

total 12 marks

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

Question Number	Answer	additional guidance	Mark
4(b)(i)	120 + 58 + 5 + 70 = 253 253 x 10^{12} 2.53 x 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 x 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: • (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)	An explanation that makes reference to two of the following: • (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)	not just heats up earth / atmosphere not just increases temp	**2**

total 11 marks

Question Number	Answer	additional guidance	Mark
5(a)	An answer that makes reference to 5 of the following points. fish caught / traditional fishing graph 1 • 1 increased (in all countries) (1) • 2 increased by almost same proportion in each country (1) fish farming graph 2 • 3 increase in farming (in all countries) (1) • 4 increased most in A (1) • 5 higher growth in C than B (1) comparison • 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) other • 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)	An explanation that that makes reference to five of the following points: • 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	not just control diet unqualified not just clean the water unqualified	**5**

total 10 marks

Question Number	Answer	additional guidance	Mark
6 (a)	• 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)	must have concentration , percentage or water potential not just salt solution	**1**

Question Number	Answer	additional guidance	Mark
6(b)	• volume of (diluted) blood / volume of solution / time solution left for / concentration of (diluted) blood sample / concentration of blood plasma / eq	not volume of water ignore amount	**1**

Question Number	Answer	Mark
6(c)(i)	An explanation that makes reference to two of the following : • 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)	An explanation that makes reference to two the following: • 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)	An description that makes reference to the following: • 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