Pearson Edexcel

Mark Scheme (Results)

Summer 2024

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	Mark
1(a)	• drowning / being washed overboard / sinking / storms / (bad) weather / attacked / killed by sharks by predators / eq (1)	**1**

Question Number	Answer	Mark
1(b)	An explanation that makes reference to three of the following points: 1. only based on forecasts / model / not happened yet / can't predict future / 30 years is a long way off / not guaranteed / eq (1) 2. other (scientists) have different view / only an opinion / government policy may change / eq (1) 3. amount of sea farms may change / may not work / unproven / untested / eq (1) 4. peoples' tastes may changes / diet / choices / demand for fish may change / eq (1) 5. effect of climate change / sea temperature rising / levels rising / global warming /eq (1) 6. effect of pollution / eq (1)	**3**

Question Number	Answer	Additional guidance	Mark
1(c)	An explanation that makes reference to three of the following points: 1. (fish) faeces / waste / uneaten food /eq (1) 2. nitrate / phosphate levels increase / eq (1) 3. leads to algal growth / eutrophication / (eq) 4. less oxygen (for respiration)/ oxygen used (by bacteria) / eq (1) 5. chemicals / hormones /eq (1) 6. bacteria / decomposers / eq (1)	allow pesticide / insecticide/ fungicide / antibiotic	**3**

Question Number	Answer	Additional guidance	Mark
1(d)(i)	A description that makes reference to two of the following points: 1. pesticide / insecticide / fungicide / eq (1) 2. antibiotics / vaccinate fish / eq (1) 3. selective breeding / GM fish / eq (1) 4. separating / isolating diseased fish / removing sick / dead fish / eq (1) 5. low stocking density /eq (1)	 ignore medicine / drugs not species	**2**

Question Number	Answer	Additional guidance	Mark
1(d)(ii)	An explanation that makes reference to two of the following points: 1. pesticide / insecticide / fungicide/ antibiotic / kill other organisms / disrupt food chain /eq (1) 2. (pesticide / insecticide / fungicide / antibiotics) can (bio)accumulate / eq (1) 3. (antibiotics) lead to antibiotic resistance / eq (1) 4. selective bred / GM organisms may escape and interbreed / eq (1)	need method and effect	**2**

Question Number	Answer	Mark
1(e)	An explanation that makes reference to two of the following points: 1. deep water / greater volume / eq (1) 2. (so) dilution / reduces concentration / eq (1) 3. fast water flowing / eq (1) 4. (so) dispersed / carried away / eq (1)	**2**

Question Number	Answer		Additional guidance	Mark
1(f)	An answer that includes : • further from shore / further from land / isolated / longer distance to travel / no population nearby / need to use boat to reach / take a long time to get there / eq (1)		ignore ref to weather	**1**

Question Number	Answer	Additional guidance	Mark
1(g)	An answer that includes one of : • is cheaper / use cheaper food (readily available) / surplus food / crop waste /eq (1) • more efficient energy transfer / eq (1) • will not eat each other / other fish / eq(1)	Allow converse	**1**

Question Number	Answer	Additional guidance	Mark
1(h)	An explanation that makes reference to two of the following points: • less fuel / less transport of equipment /supplies / workers / less food miles / eq (1) • less energy used / less electricity / less machinery (in running / building) / eq (1) • less carbon dioxide released (from burning the fossil fuel) / eq (1)	allow converse	**2**

Total = 17 marks

Question Number	Answer	Mark
2(a)	The only correct answer is D homeostasis *A is not correct as it is not absorption* *B is not correct as it is not diffusion* *C is not correct as it is not egestion*	**1**

Question Number	Answer	additional guidance	Mark
2(b)(i)	**Calculation method not marking points** insensible loss = 0.4 + 0.5 = 0.9 percentage = 0.9 ÷ total loss (0.9 ÷ 2.5) × 100 = 36% (2)	 allow 1 for 0.9 or ÷ 2.5 allow full marks for 36 with no working	**2**

Question Number	Answer	additional guidance	Mark
2(b)(ii)	**Calculation method not marking points** per kg fluid input = 0.5 for 70 kg = 0.5÷ 70 = 0071 litre per kg = 0.0071 × 110 = 0.78 allow any value between 0.77- 0.80(2)	 allow 1 mark for ÷ 70 or × 110 for 2 marks with no working	**2**

Question Number	Answer	additional guidance	Mark
2(b)(iii)	An explanation that makes reference to four of the following points: 1. **more** water lost / **less** water in body /eq (1) 2. water / liquid lost in vomiting / faeces / diarrhoea / eq (1) 3. (more) sweating / eq (1) 4. concentration of blood increases / water potential lowered / eq (1) 5. (more) ADH produced / secreted / eq (1) 6. by hypothalamus / pituitary (1) 7. permeability of collecting duct increases / eq (1) 8. more water reabsorbed / less water lost in urine / more concentrated urine / less urine / eq (1)	less water absorbed from food	**4**

Question Number	Answer	additional guidance	Mark
2(c)	An answer that makes reference to four of the following points: In winter 1. body mass lower / eq (1) 2. as fewer plants available / less food / hibernating / eq (1) 3. less sunlight / lower temp / less photosynthesis / eq (1) 4. (much) more water intake / eq (1) 5. as more rainfall/ eq (1) 6. less concentrated urine in winter / more urine / eq (1) 7. (so) more water lost in urine / eq (1) 8. Ref to data for urine 3× less concentrated in winter / water input 4 × higher in winter / eq (1)	In summer higher in summer more plants more sunlight less water intake less rainfall more concentrated less water lost urine x 3 more conc/ water input 4 x lower urine x 3 more conc. in summer **scores 2 marks** mp 8 and 6	**4**

Total = 13 marks

Question Number	Answer	Mark
3(a)(i)	The only correct answer is D T (is the pore of a sweat gland) *A is not correct as Q is not the pore of a sweat gland* *B is not correct R is not the pore of a sweat gland* *C is not correct S is not the pore of a sweat gland*	**1**

Question Number	Answer	Mark
3(a)(ii)	The only correct answer is B R (is the structure that carries blood) *A is not correct as P is not the structure that carries blood* *C is not correct as S is not the structure that carries blood* *D is not correct as T is not the structure that carries blood*	**1**

Question Number	Answer	additional guidance	Mark
3(a)(iii)	A description that that makes reference to four of the following points: 1. <u>vasoconstriction</u> (1) 2. arterioles supplying capillaries near skin surface constrict / blood vessels supplying skin narrow /eq (1) 3. less blood (flows) to skin surface / eq (1) 4. (hair) erector muscle contract / hair stands up eq (1) 5. traps air / insulates/ eq (1) 6. less heat loss by radiation / convection / evaporation (of sweat) eq (1) 7. less sweating / eq (1)	ignore shivering reject capillaries <u>arterioles constrict</u> = mp 1 **and** mp 2 more away from skin surface not just less heat loss unqualified less evaporation of sweat scores mp 7 only	**4**

Question Number	Answer	additional guidance	Mark
3(b)	An answer that that makes reference to five of the following points: 1. (mean) skin temperature is high(er) in young /eq (1) 2. (mean) skin temperature is high(er) with heat strain / eq (1) 3. mean sweating rate high(er) in young / eq (1) 4. mean sweating rate high(er) in moderate / higher heat strain/ eq (1) 5. small(er) difference in sweating rate between low and moderate strain in young / eq (1) 6. no information on sweat rate with no heat strain / at rest / eq (1) 7. more sweat glands in young / each gland produces more sweat in young / eq (1) 8. young can reduce (core) body temperature faster / more / young less likely to overheat /eq (1) 9. numbers very small / not repeated / unreliable / no information on age / eq (1) 10. no information on BMI / fat layers / health / diet / eq (1)	allow converse	**5**

Total = 11 marks

Question Number	Answer	additional guidance	Mark
4(a)(i)	• colour of indicator / carbon dioxide concentration / eq (1)	not gas exchange	**1**

Question Number	Answer	Mark
4(a)(ii)	• stops leaves / maggots falling in indicator / hold organisms in place / separates organism from solution/ eq (1)	**1**

Question Number	Answer	additional guidance	Mark
4(a)(iii)	• volume of indicator / volume of solution / time in tube / size of tube / eq (1)	allow mass / 5cm^3/ conc of indicator not amount of indicator	**1**

Question Number	Answer	Mark
4(b)	An explanation that that makes reference to four of the following points: 1. tube C / tube D / maggots produce CO_2 / CO_2 increases (light and dark) / eq (1) 2. by respiration / eq (1) 3. tube B / leaves produce CO_2 in dark / CO_2 increases / eq (1) 4. tube A / leaves absorb CO_2 in the light / CO_2 decreases/ eq (1) 5. for photosynthesis /eq (1) 6. tube E no change in CO_2 / no gain or loss of CO_2 / eq (1)	**4**

Question Number	Answer	Mark
4(c)	An explanation that that makes reference to two of the following points: • carbon dioxide concentration is unchanged / CO_2 released and CO_2 absorbed / eq (1) • respiration and photosynthesis / eq (1)	**2**

Total = 9 marks

Question Number	Answer	additional guidance	Mark
5(a)(i)	**Calculation method not marking points** global loss from Russia Brazil and Canada = 76.0 + 62.8 + 49.3 = 188.1 Mha in percentage = 42% therefore total global loss = 188.1 ÷ 42 1% = 4.48 total global loss = 448 Mha – 188.1 = 259.9 Mha allow answer in range 258 to 260 (2)	allow 1 for (1% =) 4.47 to 4.49 Or for (100%) = 447-449	**2**

Question Number	Answer	additional guidance	Mark
5(a)(ii)	**Calculation method not marking points** loss from 2001 to 2021 = 62.8 Mha 62.8 ÷ (20×12) 0.262 = 2.62×10^{-1} (2)	allow 1 for ÷ 240 or ÷ (20×12) **or** 1 for 0.26 / 0.262 / 0.2617 / 0.2616 recurring allow 2.6×10^{-1} or 2.617×10^{-1} (2)	**2**

Question Number	Answer	additional guidance	Mark
5(a)(iii)	An explanation that's makes reference to two of the following : • Russia has the most forest / larger area / bigger country / most tree cover / has high biomass / many trees / eq (1) • has a big effect on total / makes up a large % of the world / contributes more to total / world / high proportion of the total trees / eq (1) • so even a low percentage change is a large amount / eq (1)		**2**

Question Number	Answer	Mark
5(b)	A description that makes reference to four of the following points: 1. reduces biodiversity / loss of species / habitat loss / eq (1) 2. increases CO_2 / less CO_2 absorbed / eq (1) 3. less photosynthesis / eq (1) 4. reduced soil quality / less minerals returned to soil / less fertile / barren / leaching / eq (1) 5. soil erosion / washed away / eq (1) 6. flooding / eq (1) 7. disturbs water cycle / less transpiration / less rainfall / eq (1)	**4**

Total = 10 marks

Question Number	Answer	additional guidance	Mark
6(a)	An answer that makes reference the following • gene is a section of DNA that codes for a single polypeptide / protein **and** a genome includes all of the DNA / all of the genes in an organism /eq (1)	require both for 1 mark	**1**

Question Number	Answer	additional guidance	Mark
6(b)	An explanation that makes reference to four of the following points: 1. DNA unzips / unwinds / eq (1) 2. <u>mRNA</u> / <u>messenger RNA</u> / eq (1) 3. mRNA copies code of DNA strand / DNA code copied / sequence copied / code carried by mRNA / eq (1) 4. in nucleus / leaves nucleus / eq (1) 5. mRNA goes to ribosome / eq (1)	DNA acts as template for mRNA	**4**

Question Number	Answer	Mark
6(c)	An explanation that makes reference to three of the following points: 1. some sequences / codons / different codes / different bases / may code for same **amino acid** /eq (1) 2. no change in **protein** / same **protein** / no change in enzyme / same enzyme / eq (1) 3. may not affect bonding / (3D) shape / active site of enzyme / still binds to substrate / eq (1) 4. allele may be recessive / not expressed / eq (1) 5. non-coding DNA / eq (1)	**3**

Question Number	Answer	additional guidance	Mark
6(d)	An answer that makes reference to the following points: genes only • blood group / eye colour / examples of single genes / eq (1) genes and environment • mass / height / skin colour / behavioural traits / eq (1)	Examples seen iris colour figure / body shape / hair colour	**2**

Total = 10 marks

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