Mark Scheme (Results)

November 2025

Pearson Edexcel International GCSE in Biology 4BI1/2B

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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)	• 57 (%) (2) **One mark** for 56.666667	 **Accept** 56 **or** 56.….. for one mark **or** any combinations of 56.6…7	**2**

Question Number	Answer	Mark
1(b)(i)	The only correct answer is **D (*Plasmodium*)** *A is incorrect as* Amoeba *does not cause malaria* *B is incorrect as* Chlorella *does not cause malaria* *C is incorrect as* Mucor *does not cause malaria*	**1**

Question Number	Answer	Additional guidance	Mark
1(b)(ii)	An explanation that that makes reference to two of the following: • <u>adrenaline</u> (is released) (1) • into the blood / into blood plasma / is a hormone / eq (1) • speeds up heart rate / eq (1)	 **Accept** adrenalin **Accept** adrenaline is a hormone = 2 marks	**2**

Question Number	Answer	Additional guidance	Mark
1(c)	An explanation that that makes reference to two of the following: • muscles <u>contract</u> / (senna) stimulates <u>contractions</u> / eq (1) • (stimulates) <u>peristalsis</u> (1) • so faeces / waste / food / eq, is moved through gut / colon / intestines / eq (1)	**Accept** waste is removed **Accept** increases egestion **Accept** stools pass more easily	**2**

Question Number	Answer	Additional guidance	Mark
1(d)	An explanation that that makes reference to four of the following: 1. mutation (to produce plants with terpenes) (1) 2. (leading to) variation (1) 3. (plants with terpenes) survive / not eaten / eq (1) 4. (these plants) reproduce / offspring produced / eq (1) 5. and pass on alleles / genes / mutation (for terpenes) (1)	**Allow** converse for plants without the mutation **Allow** converse for plants without the mutation **Allow** converse for plants without the mutation	**4**

Question Number	Answer	Additional guidance	Mark
1(e)	An explanation that makes reference to two of the following: 1. thicken / repair, uterus lining / endometrium / eq (1) 2. so embryo can implant / so implantation can occur / eq (1) 3. so placenta can grow into lining / eq (1) 4. (high (phyto)oestrogen) stimulates LH release / eq (1) 5. (LH will) stimulate ovulation (1)	**Ignore** maintain **Ignore** inhibit / stimulate FSH **Accept** oestrogen will stimulate ovulation	**2**

Question Number	Answer	Additional guidance	Mark
1(f)	• mitosis (1)	**Accept** mytosis / meitosis	**1**

Question Number	Answer	Additional guidance	Mark
1(g)	An explanation that makes reference to two of the following: • more air breathed in / more air breathed out / more air passes to lungs / more air passes to alveoli / more air inhaled / eq (1) • maintains concentration gradient / steeper concentration gradient / eq (1) • more oxygen diffuses (into blood) / faster diffusion (of oxygen) / eq (1)	**Accept** more air exchanged **Accept** more oxygen inhaled **Ignore** more gas exchange **Accept** steeper diffusion gradient	**2**

Question Number	Answer	Additional guidance	Mark
1(h)	A description that that makes reference to the following: • restriction enzyme / endonuclease, **AND** cuts gene / DNA / plasmid (1) • ligase **AND** joins, DNA / genes / plasmid (1)	**Accept** restrictive **Ignore** restricted **Accept** lygase / lygaze **Reject** lipase	**2**

(Total for question 1 = 18 marks)

Question Number	Answer	Additional guidance	Mark
2(a)(i)	An answer that that makes reference to the following: • sucrose / sugar (1) • amino acids (1)	 **Ignore** glucose **Ignore** minerals **Ignore** proteins	**2**

Question Number	Answer	Additional guidance	Mark
2(a)(ii)	A description that that makes reference to four of the following: 1. plants of same species / mass / size / eq (1) 2. aphids on one plant and not on second plant / change number of aphids on plants / eq (1) 3. measure <u>change / difference</u> in mass / measure mass before and after / eq (1) 4. leave for same time / a specified time / eq (1) 5. place lamp same distance / control light intensity / eq (1) 6. repeats / means / averages / eq (1) 7. same humidity / wind speed / temperature / minerals in soil / same water (in soil at start) / eq (1)	 **Accept** use same plant (with and without) **Accept** weight **Accept** pH of soil / same soil	**4**

Question Number	Answer	Additional guidance	Mark
2(b)	An answer that that makes reference to four of the following: 1. aphids increase before pesticides used (for P / Q / both) / eq (1) 2. (and then) P **and** Q / both pesticides, reduce the number of aphids / eq (1) 3. (P reduces aphids) more / (P kills) more aphids (than Q) / (P has) bigger decrease in aphids / eq (1) 4. aphids with Q are higher (than P) until <u>week 8 / 9 / for five weeks</u> / eq (1) 5. with P aphids increase after <u>7 / 8 weeks</u> / with Q aphids never increase / with Q aphids remain constant / with Q aphids plateau / with Q aphids remain low / eq (1) 6. Q lasts longer / Q is better for long-term / P is only short-term / P is better for short-term / eq (1) 7. aphids become <u>resistant</u> against P / P breaks down / eq (1) 8. no repeats / no mention of controls / aphid numbers different at start / eq (1)	**Accept** aphids increase up to week 2 / high number at week 2 **Reject** (mp1) if increase **after** pesticides sprayed **Accept** P decreases aphids more than Q for mp2 and mp3 **Accept** converse **Accept** converse **Accept** until <u>six / seven weeks</u> (after spraying) **Accept** P increases <u>5 / 6 weeks</u> after spraying **Accept** P stops working sooner / P better for short-term **Accept** converse for Q **Accept** named factors that may change e.g. carbon dioxide	**4**

(Total for question 2 = 10 marks)

Question Number	Answer	Mark
3(a)	The only correct answer is **D** (renal vein transporting blood away from the kidney) *A is incorrect as K is the renal vein* *B is incorrect as K is the renal vein* *C is incorrect as K transports blood away from the kidney not to the kidney*	**1**

Question Number	Answer	Additional guidance	Mark
3(b)(i)	An explanation that makes reference to two of the following: • (selective) <u>re</u>absorption / <u>re</u>absorbed / absorbed into blood / glucose returned to blood (1) • in proximal convoluted tubule / PCT / first convoluted tubule / eq (1) • by active transport (1)		**2**

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	An explanation that that makes reference to two of the following: 1. water is reabsorbed / water is absorbed (into blood) / eq (1) 2. (water is reabsorbed) by osmosis (1) 3. urea is not (re)absorbed / eq (1) 4. in the loop of Henle (1)	**Accept** urea is a waste product / urea is excreted / urea is not needed by the body	**2**

Question Number	Answer	Additional guidance	Mark
3(b)(iii)	An explanation that that makes reference to four of the following: 1. high <u>blood</u> (salt) concentration detected by hypothalamus / low <u>blood</u> water detected by hypothalamus / low water potential in <u>blood</u> detected by hypothalamus / eq (1) 2. ADH released from pituitary gland (1) 3. collecting duct more permeable (1) 4. (so more) water is <u>re</u>absorbed / water absorbed into blood (1) 5. and concentration (of urea / urine) will increase / eq (1)	**Accept** osmoreceptors for hypothalamus **Accept** concentration is high	**4**

(Total for question 3 = 9 marks)

Question Number	Answer	Mark
4(a)	The only correct answer is **C** (carbon, hydrogen, oxygen, and nitrogen) *A is incorrect as enzymes contain nitrogen* *B is incorrect as enzymes contain hydrogen* *D is incorrect as enzymes contain carbon*	**1**

Question Number	Answer	Additional guidance	Mark
4(b)(i)	An answer that that makes reference to two of the following: 1. temperature (1) 2. potato age / variety / type / eq (1) 3. mass / volume / SA / width / shape / size of potato slice / number of slices / eq (1) 4. volume of buffer / time covered in buffer / eq (1)	 **Accept** species / strain eq **Ignore** time in air	**2**

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	A description that that makes reference to two of the following: 1. judging end point is subjective / not objective / individual opinion / not standardised / biased / eq (1) 2. use of colour chart / use standard colour / use a colour to compare with / eq (1)	 **Accept** in terms of how new method would improve e.g. colour chart is not subjective (scores mp2 and mp1) **Accept** use of colorimeter / record with camera	**2**

	3. compare results with other students / get second opinion / eq (1) 4. smaller pH intervals / more precise pH intervals / wider range of pH / eq (1) 5. as optimum pH may lie between two (tested) values / rate of reaction may change between two tested pH values / eq (1)		

Question Number	Answer	Additional guidance	Mark
4(b)(iii)	A description that makes reference to three of the following: 1. optimum (pH) is 7 (1) 2. time increases away from optimum / time decreases as pH increases up to 7 **and** then increases / eq (1) 3. as enzymes denature / phenol oxidase denature (1) 4. shape of enzyme changes / eq (1) 5. so substrate does not fit active site / polyphenols do not fit active site / E/S complexes will not form / eq (1)	**Accept** around 7 / between 5 and 9 / is neutral **Accept** rate increases up to pH 7 **and** then decreases **Accept** pH 7 is fastest rate / shortest time **Accept** active site shape changes **Accept** enzyme and substrate are no longer complementary **Accept** substrate and active site do not bind	**3**

(Total for question 4 = 8 marks)

Question Number	Answer	Additional guidance	Mark
5(a)(i)	• 9.4 (1) • 8 (1)	**Accept** 9 **Accept** correct answers written in table if nothing written on answer lines	**2**

Question Number	Answer	Additional guidance	Mark
5(a)(ii)	An answer that that makes reference to three of the following: 1. (place quadrats) randomly / eq (1) 2. method for determining random numbers / eq (1) 3. to prevent bias / so sample is representative / eq (1) 4. same time of year / same time of day / same weather / same temperature / eq (1) 5. use more quadrats / repeat (more times) / use more areas / eq (1)	e.g. number generator **Accept** use of random number generator (to place quadrats) for mp1 and mp2 **Accept** keep other factors constant **Accept** other relevant named factors	**3**

Question Number	Answer	Additional guidance	Mark
5(a)(iii)	An answer that that makes reference to two of the following: 1. (fewer producers so) less photosynthesis / eq (1) 2. fewer trophic levels maintained / fewer food chains / fewer food webs / eq (1) 3. fewer types of food / less food / less nectar / eq (1) 4. fewer habitats / less shelter / fewer areas for breeding / fewer niches / less protection from predators / eq (1)	**Accept** fewer insects for predatory insects to eat / eq **Accept** lose their homes **Accept** less water for insects on trees	**2**

Question Number	Answer	Additional guidance	Mark
5(b)(i)	An answer that that makes reference to the following: • colour of indicator / colour (change) / change in gas composition / change in carbon dioxide / carbon dioxide concentration / ratio of gases / gas exchange / eq (1)	**Accept** levels / amounts of carbon dioxide	**1**

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	An answer that that makes reference to four of the following: 1. in A, colour stayed orange **and** in B, colour went yellow (1) 2. in A, no change in carbon dioxide / no change in gases / eq (1) 3. in B, carbon dioxide increases / more carbon dioxide released than removed / eq (1) 4. in A, photosynthesis (rate) and respiration (rate) are the same / eq (1) 5. in B, respiration (rate) is higher than photosynthesis (rate) / eq (1) 6. photosynthesis removes carbon dioxide / respiration releases carbon dioxide / eq (1)	**Accept** colour stayed same in A **and** went yellow in B **Accept** equal production and use of carbon dioxide / eq **Accept** carbon dioxide does not increase / decrease / eq **Accept** high level of carbon dioxide / more carbon dioxide produced than used **Accept** more respiration than photosynthesis	**4**

Question Number	Answer	Additional guidance	Mark
5(b)(iii)	An answer that that makes reference to one of the following: • the jar is closed / jar is a sealed system / rainforest is not a sealed / rainforest is much larger / weather would affect results in a forest / light varies in a forest / eq (1) • rainforest has more trees / rainforest has other species / rainforest has more organisms / rainforest has more animals / rainforest has more plants / eq (1)	**Accept** no changes in seasons **Accept** jar has a bung (to prevent gas exchange with atmosphere) **Accept** rainforest has more complex ecosystem / food webs / more food chains / more biodiversity	**1**

(Total for question 5 = 13 marks)

Question Number	Answer	Additional guidance	Mark
6(a)	An answer that that makes reference to four of the following: 1. transcription in nucleus / translation in the cytoplasm / translation on ribosomes (1) 2. messenger RNA made by transcription / mRNA made by transcription (1) 3. mRNA moves to ribosome / mRNA binds to ribosome (1) 4. transfer RNA brings amino acid / tRNA brings amino acids (1) 5. codons bind to anticodons / eq (1) 6. polypeptide chain made / chain of amino acids made / amino acids joined together / eq (1)	**Accept** mRNA is made from gene / from DNA **Accept** description of how mRNA made from DNA **Reject** if codons are on tRNA / anticodons on mRNA	**4**

Question Number	Answer	Additional guidance	Mark
6(b)(i)	1150 (%) (**3 marks)** If incorrect answer, then award: **One mark** for correct identification of 20 **AND** 250 **AND** **One mark** for correct subtraction of two figures from the graph **Award two marks** for 230 **or** (250-20) in working		**3**

Question Number	Answer	Additional guidance	Mark
6(b)(ii)	An answer that that makes reference to five of the following: 1. antibodies produced after day 3 / after first dose / antibodies increase after 3 days / eq (1) 2. memory cells are made / eq (1) 3. primary (immune) response occurs after first dose / secondary (immune) response occurs after second dose / at day 30 / eq (1) 4. (secondary response) has higher antibody number / quicker response / more antibodies (than primary) made after 30 days / more antibodies (than primary) after second dose / eq (1) 5. person 1 makes most antibodies / highest peaks / biggest responses / person 3 has poor response / eq (1) 6. no need for needles / easier to administer / would be cheaper / no need for medical professionals / eq (1) 7. small sample size / other people could have different responses / may not work on everyone / eq (1) 8. no idea of sex / health / infection state / age / previous exposure to viruses / eq (1) 9. not tested on other pathogens / may not work for all viruses / eq (1) 10. if people are immune then viruses cannot reproduce / could provide herd immunity / eq (1)	**Accept** days between 3 and 7 / after 2 days **Accept** antibodies are produced after first dose / eq **Accept** bigger response after second dose **Accept** vaccine is effective for 1 **OR** 2 / vaccine not effective for 3 **Accept** vaccine most effective for person 1 / vaccine least effective for person 3 **Accept** only tested on three people / not a wide rnage **Accept** not reliable **Accept** person 3 may be immunosuppressed	**5**

(Total for question 6 = 12 marks)