Pearson

Mark Scheme (Results)

November 2025

Pearson Edexcel International GCSE in Biology (Modular)
4WBI2/1B

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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)(i)	• A (random) change in the {DNA/sequence of bases/genes/genetic material} (1)		**1**

Question Number	Answer	Additional guidance	Mark
1(a)(ii)	An answer that makes reference to the following • (ionising) radiation (1) • chemical mutagens (1)	**Accept** named example for either **Accept** carcinogens	**2**

Question Number	Answer	Additional guidance	Mark
1(b)	An answer that makes reference to the following: • large surface area /thin walls (1) • to increase rate of osmosis/diffusion (1)	**Accept** description e.g., long, thin shape **Ignore** water absorption	**2**

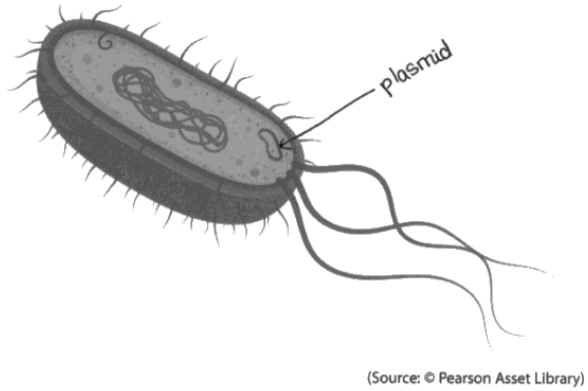
Question Number	Answer	Additional guidance	Mark
1(c)	An answer that makes reference to one of the following: • humidity (1) • wind/air speed (1)		**1**

Question Number	Answer	Additional guidance	Mark
1(d)	An answer that makes reference to the following: • decomposers produce ammonia (1) • nitrogen fixing bacteria convert atmospheric nitrogen to ammonia (1) • nitrifying bacteria convert ammonia to nitrite/nitrate (1)		**3**

Question Number	Answer	Additional guidance	Mark
1(e)(i)	An answer that makes reference to two of the following: • may increase growth of weeds (1) • which will compete with crop plants (1) OR • washed into streams/rivers / eutrophication (1) • can cause harm to aquatic life / kill aquatic life (1) OR • increased growth of crop plants (1) • may lead to biodiversity loss (1)		**2**

Question Number	Answer	Additional guidance	Mark
1(e)(ii)	2.5 (2) If incorrect answer, then award: **One mark** for 142 **OR** 57 seen anywhere in working		**2**

(Total for question 1 = 13 marks)

Question Number	Answer	Additional guidance	Mark
2(a)	• Line drawn to indicate plasmid (1)  (Source: © Pearson Asset Library)	**Ignore** label text **Reject** if more than one line drawn	**1**

Question Number	Answer	Additional guidance	Mark
2(b)	180 (2) If incorrect answer, then award: **One mark** for 512 is 9 divisions (1)		**2**

Question Number	Answer	Additional guidance	Mark
2(c)	An answer that makes reference to three of the following: • temperature/pH control (1) • nutrients provided (1) • oxygenation/aeration (1) • use of agitation/stirring (1)	**Accept** optimum temperature	**3**

Question Number	Answer	Additional guidance	Mark
2(d)	An answer that makes reference to the following: • can introduce genes from other species/organisms (1) • to introduce desirable characteristics (1)	**Accept** named example e.g. disease resistance/increased yield etc.	**2**

(Total for question 2 = 8 marks)

Question Number	Answer	Mark
3(a)(i)	The only correct answer is **C (S)** *A is incorrect as P is the pituitary gland* *B is incorrect as R is the pancreas* *D is incorrect as T is the uterus*	**1**

Question Number	Answer	Mark
3(a)(ii)	The only correct answer is **B (R)** *A is incorrect as Q is the thyroid* *C is incorrect as S is an ovary* *D is incorrect as U is a kidney*	**1**

Question Number	Answer	Additional guidance	Mark
3(b)	An answer that makes reference to the following: • sweat glands are (more) active / (more) sweat produced (1) • blood vessels are larger/wider / (arteriole) vasodilation (1) • hair is laying flat/hair erector muscle relaxes (1)	**Ignore** reference to pores	**3**

Question Number	Answer	Additional guidance	Mark
3(c)	An answer which makes reference to the following • increases heart rate (1) • blood vessels to large muscles widen / increased blood flow to muscles / eq (1) • blood vessels to digestive system narrow / decreased blood flow to digestive system / eq (1)		**3**

(Total for question 3 = 8 marks)

Question Number	Answer	Additional guidance	Mark
4(a)	• vena cava (1)	**Ignore** superior/inferior **Accept** phonetic spellings	**1**

Question Number	Answer	Additional guidance	Mark
4(b)	Award one mark per correctly completed row **Description** / **Structure** vessel that carries oxygenated blood — I bicuspid valve — C chamber that pumps blood to the lungs — E	**Reject** row if more than one letter given	**3**

Question Number	Answer	Additional guidance	Mark
4(c)(i)	• scale half grid and linear (1) • axis labelled type of exercise AND axis labelled increase in heart rate in beats per minute (1) • type of exercise on x axis / increase in heart rate on y axis • bars plotted correctly +/- half small square (1) **Type of exercise** / **Increase in heart rate in beats per minute** walking — 23 jogging — 41 running — 68 running uphill — 87	must show 0 or scale break list of four different exercises alone does not score can be inferred from scale line graph does not score plotting mark	**4**

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	An answer which makes reference to three of the following • more intense activity leads to a greater increase in heart rate / eq (1) • more energy needed by the body (1) • due to greater/more muscle contraction with increased intensity (1) • more oxygen/glucose required / more carbon dioxide must be removed (1) • to increase the rate of aerobic respiration/to reduce anaerobic respiration (1)	**Allow** idea of increased speed increasing heart rate more	**3**

(Total for question 4 = 11 marks)

Question Number	Answer	Additional guidance	Mark
5	An answer that makes reference to five of the following: Maximum 4 from: Advantages 1. glasshouses can be temperature-controlled (1) 2. increased temperature leads to an increased rate of photosynthesis (1) 3. so more energy is available for growth of fruit (1) 4. may have additional lighting to provide more light for photosynthesis (1) 5. glasshouses provide shelter and reduce convection currents (1) 6. glasshouses protect from pests / eq (1) Disadvantages 7. increased temperature means higher energy costs (1) 8. artificial irrigation / climate control needed (1) 9. cost of installation / maintenance (1)	**Ignore** cost unqualified	**5**

(Total for question 5 = 5 marks)

Question Number	Answer	Additional guidance	Mark
6(a)(i)	• two copies needed **to be expressed**/only expressed if no dominant allele present /eq (1)		**1**

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	• correct parental genotypes / bb and Bb (1) • correct parental gametes / b or b and B or b (1) • correct genotypes for offspring / Bb bb Bb bb(1)	**Accept** use of alternative letters **Allow** from Punnet square ECF max 2 for MP2 gametes and MP3 genotype of offspring	**3**

Question Number	Answer	Additional guidance	Mark
6(b)	An answer that makes reference to three of the following: • different fields may have different levels of sunlight (1) • different fields may have different levels of nutrients / mineral ions (1) • unlikely that {all plants are genetically identical/no genetic variation/ eq} in each field (1) • variation may be due to a combination of genetic and environmental factors (1)	**Accept** height may have genetic component	**3**

Question Number	Answer	Additional guidance	Mark
6(c)	An answer that makes reference to four of the following: • select cotton plants with desirable feature/long fibres (1) • cross breed selected cotton plants (1) • select offspring with desirable feature/longest fibres (1) • repeat process over multiple generations / many times / eq (1) • until all offspring have desirable feature/long fibres (1)		**4**

(Total for question 6 = 11 marks)

Question Number	Answer	Additional guidance	Mark
7(a)	An answer that makes reference to the following point and one of the two linked pairs: • sulfur dioxide {mixes with water in the atmosphere / causes acid rain /eq} (1) **AND** • can acidify soils (1) • reduces crop growth/quality/eq (1) **OR** • can acidify lakes/rivers (1) • harms aquatic life/eq (1)		**3**

Question Number	Answer	Additional guidance	Mark
7(b)(i)	carbon dioxide / water vapour / nitrous oxide / methane / CFCs	**Accept** named CFC	**1**

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	An answer that makes reference to one of the linked pairs: Named consequence of global warming (1) correctly linked effect on living organisms (1) For example: • polar ice caps / sea ice melting (1) • reduce habitats / hunting grounds for polar animals / eq (1) OR • change to ocean temperature / currents (1) • may harm aquatic life (1) OR • climate change/ increased rainfall / desertification (1) • may affect availability of food / shelter / habitats for animals / eq (1) OR • increased global temperatures (1) • may lead to increase in pest species / vectors for pathogens (1)	**Accept** any other reasonable response	**2**

Question Number	Answer	Additional guidance	Mark
7(c)	An answer that makes reference to six of the following: 1. untreated sewage may contain pathogenic bacteria (1) 2. (pathogenic bacteria) may be a danger to human health / aquatic life (1) 3. decomposers/microorganisms present in the sewage (1) 4. (decomposers) feed on / decompose organic matter (1) 5. oxygen consumption of decomposers increased as they respire (1)		**6**

	6. decreasing oxygen concentration of water in the waterway (1) 7. leading to damage to/death of aquatic species which cannot survive in low levels of oxygen (1) 8. potential increase in aquatic species which thrive in low(er) oxygen environments (1)		

(Total for question 7 = 12 marks)

Question Number	Answer	Additional guidance	Mark
8(a)(i)	temperature (1)	**Reject** if more than one variable stated	**1**

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	An answer that makes reference to two linked pairs from the following: • volume of water (1) • measure same volume of water for each seed (1) • mineral ion availability (1) • use same mass/type of compost in each tray / eq (1) • distribution of seeds (1) • measure distances between seeds / put one seed in each division / eq (1) • light level (1) • place tray set distance from a lamp / light source / eq (1) • type of seed (1) • use same variety/species of perennial ryegrass seed for all trials (1)	**Accept** time of watering **Accept** same size of planting area	**4**

Question Number	Answer	Additional guidance	Mark
8(b)(i)	82 (2) If incorrect answer, then award: **One mark** for 80 x4 **OR** 320 seen in working		**2**

Question Number	Answer	Additional guidance	Mark
8(b)(ii)	Any three of the following: • seeds germinate better at shallower depths / seeds grow better closer to the surface / eq (1) • seeds are more exposed (1) • seeds are more likely to be eaten (1) • seeds more likely to be damaged by environmental factors (1)		**3**

(Total for question 8 = 10 marks)

Question Number	Answer	Additional guidance	Mark
9(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
9(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
9(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 range **Accept** not reliable **Accept** person 3 may be immunosuppressed	**5**

(Total for question 9 = 12 marks)