Pearson

Mark Scheme (Results)

Summer 2026

Pearson Edexcel International Advanced Subsidiary Level in Biology

WBI12/01A

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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)	**The only correct answer is C number of different species in a given area** ***A*** *is not correct because genetic diversity is not correct* ***B*** *is not correct because genetic diversity is not correct* ***D*** *is not correct because that is species evenness*	**(1)**

Question Number	Answer	Additional guidance	Mark
1(b)	An answer that makes reference to the following points: • index of diversity would decrease (1) • because {fewer different plant species would grow / some plant species would be killed by the herbicides} (1)	**IGNORE** plants killed unqualified **ACCEPT** species {richness/evenness} decreases **ACCEPT** fewer {animal / herbivore} species	**(2)**

Question Number	Answer	Additional guidance	Mark
1(c)	A description that makes reference to the following points: • {collect / store} seeds from spiked rice flower plants (1) • supply seeds for reintroduction programmes (1)	**ACCEPT** ensure range of alleles are stored **IGNORE** collect seeds unqualified **IGNORE** descriptions of storage process **ACCEPT** seeds can be planted {in the future / other places} **ACCEPT** seeds can be used to breed more plants in the future **IGNORE** breed new species	**(2)**

Question Number	Answer	Additional guidance	Mark
1(d)	A description that makes reference to the following points: • as height above sea level increases, the ratio of male to female flowers increases (1) • non-linear increase (1)	**ACCEPT** positive correlation between height and ratio **IGNORE** positive correlation unqualified **ACCEPT** steep increase after {195 / 200} m **ACCEPT** greater range in ratio after 150 m	**(2)**

Question Number	Answer	Additional guidance	Mark
2(a)	An answer that makes reference to the following point: • a group of different organs that work together to perform {a function / functions} (1)	**ACCEPT** named organs working together to digest and absorb molecules	**(1)**

Question Number	Answer	Additional guidance	Mark
2(b)(i)	Archaea and bacteria (1)	both required for the mark **ACCEPT** eubacteria **IGNORE** Prokarya	**(1)**

Question Number	Answer	Additional guidance	Mark
2(b)(ii)	An answer that makes reference to the following points: • correct similarity (1) • correct difference (1)	e.g. no {nucleus / membrane bound organelles} / both have {cell walls (unqualified) / 70S ribosomes / ether lipids / circular DNA / nucleoid / RNA / cell membrane / plasmids / flagella / pili / slime capsule REJECT 80S ribosomes / both have peptidoglycan cell wall e.g. have different components in their cell walls / archaea {genes / are more similar to eukaryotic than bacterial cells / different membrane lipids / different tRNA / different ribosomes / archaea have histone **IGNORE** incorrect cell wall components	**(2)**

Question Number	Answer	Additional guidance	Mark
2(b)(iii)	An answer that makes reference to two of the following points: • suitable described adaptations (1) • stomach contents contain {water / glucose / amino acids} (1) • which *H. pylori* need for {respiration / cell division / hydrolysis / protein synthesis / metabolic reactions} (1)	e.g. slime capsule, enzymes with acidic optimum pH / urease / helical shaped flagella **IGNORE** acidic optimum pH unqualified **IGNORE** nutrients / food e.g. flagella help to burrow into the stomach mucus lining to avoid stomach acid / capsule protects from {stomach enzymes / HCl} / urease neutralises surrounding environment	**(2)**

Question Number	Answer	Additional guidance	Mark
2(c)(i)	• plasmid contains {extra / additional} genes (1)	**ACCEPT** other correct reasons e.g. contains genes for antibiotic resistance e.g. used to transfer genetic material between cells **IGNORE** contains genetic information unqualified / references to GM	**(1)**

Question Number	Answer	Mark
2(c)(ii)	**The only correct answer is B can cover membrane glycoproteins and helps cell adhere to surfaces** ***A*** *is not correct because the capsule helps cell adhere to surfaces* ***C*** *is not correct because the capsule can cover glycoproteins* ***D*** *is not correct because the capsule can cover glycoproteins*	**(1)**

Question Number	Answer	Additional guidance	Mark
3(a)(i)	An answer that makes reference to one of the following points: • {angler fish / esca} supplies prokaryotic organisms with {named biological molecule / ions / vitamins / oxygen} (1) • angler fish supplies prokaryotic organisms with {habitat / place to live / place to reproduce} (1)	**IGNORE** food / nutrients / energy / water **ACCEPT** aerobic environment **ACCEPT** protection from predators **ACCEPT** provides suitable environment **IGNORE** protection from cold	**(1)**

Question Number	Answer	Mark
3(a)(ii)	**The only correct answer is D the role of the angler fish in its environment** ***A*** *is not correct because niche is not the adaptations shown by the angler fish* ***B*** *is not correct because niche is not the part of the ocean where the angler fish lives* ***C*** *is not correct because niche is not the prey of the angler fish*	**(1)**

Question Number	Answer	Additional guidance	Mark
3(a)(iii)	An answer that makes reference to one of the following points: • {sharp teeth / large mouth} to {grasp / bite} prey (1) • {fins / tail} to help fish to swim through the water (1) • gills to absorb oxygen from water (1) • dark colour for camouflage (1)	**IGNORE** references to esca **ACCEPT** large mouth to eat prey	**(1)**

Question Number	Answer	Mark
3(b)(i)	**The only correct answer is D 134 : 1** ***A*** *is not correct because 119 m : 89 cm is not 0.007 : 1* ***B*** *is not correct because 119 m : 89 cm is not 0.75 : 1* ***C*** *is not correct because 119 m : 89 cm is not 1.34 : 1*	**(1)**

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	An answer that makes reference to one of the following points: • both have tentacles (1) • both have {rounded / dome-shaped} head end / streamlined (shape) (1)	**IGNORE** pili / flagella **ACCEPT** no bones / soft body / no heart / transparent body	**(1)**

Question Number	Answer	Additional guidance	Mark
3(b)(iii)	An answer that makes reference to the following points: • allows the organisms to occupy a {particular / different} niche (1) • correct examples why a colony can have an increased chance of survival (1) • other species of zooid apart from gonophores would not reproduce as separate organisms (1)	e.g. colony increases chance of survival / converse for separate organisms e.g. specialising to have only one function {is more energy efficient / increases energy transfer} e.g. {tentilla / light} attract prey for the {gastrozooid / tentacles} to {capture / digest} e.g. gastrozooid provide {amino acids / glucose / triglycerides / fatty acids} for growth of other zooids **ACCEPT** forming a colony allows other zooids to reproduce	**(3)**

Question Number	Answer	Additional guidance	Mark
4(a)	An answer that makes reference to one of the following points: • {communication between / connects} between plant cells (1) • allows movement of {named molecules / signalling substances} between plant cells through {symplast / cytoplasm} (1)	**ACCEPT** cytoplasmic streaming **IGNORE** references to transport of molecules {in / out} cell unqualified **IGNORE** substances unqualified	**(1)**

Question Number	Answer	Additional guidance	Mark
4(b)	A description that makes reference to two of the following points: • partially permeable membrane controls {molecules / ions} {entering / leaving} the cell (1) • separates contents of cell from external environment (1) • involved in {cell recognition / signalling / communication} (1)	**ACCEPT** maintain {cell turgidity / concentration gradients} **ACCEPT** fluid nature of membrane allows formation of vesicles in endocytosis **ACCEPT** fluid nature of membrane allows fusion of vesicles for exocytosis **IGNORE** prevent entry of pathogens / protection / maintain shape of cell **IGNORE** movement of substances {in/out} cell unqualified **ACCEPT** separates named cell contents **ACCEPT** contains {receptors / glycoprotein / glycolipids / antigens} for {hormones / chemicals}	**(2)**

Question Number	Answer	Additional guidance	Mark
4(c)	An answer that makes reference to the following points: • increased surface area (1) • which increases {the absorption / uptake} of {water / inorganic ions / named inorganic ion} from soil (1) • correct suggestion as to how this increased uptake is beneficial to growth of plant (1)	**ACCEPT** anchors plant more in soil / root goes deeper in soil **IGNORE** ions unqualified / minerals / nutrients **ACCEPT** increases osmosis e.g. {transport of / solvent for} named {molecules / substances} e.g. nitrates for {amino acid / structural protein / enzyme / nucleotides / chlorophyll	**(3)**

Question Number	Answer	Additional guidance	Mark
4(d)	A description that makes reference to three of the following points: • plant cell wall is composed of cellulose whereas fungal cell wall is composed of chitin and glucan (1) • cellulose {molecules / microfibrils} arranged in different orientations whereas {glucan molecules are facing the same direction / in fungal cell walls they are not} (1) • plant cell walls contain {plasmodesmata / pits} whereas fungal cell walls do not • some plant cell walls have secondary thickening whereas this fungal cell wall does not (1)	**IGNORE** fungal cell wall is only polysaccharides	**(3)**

Question Number	Answer	Mark
5(a)	**The only correct answer is C digitalis** ***A*** *is not correct because antibiotics were not extracted from foxglove plants* ***B*** *is not correct because cytoplasm was not the active ingredient and used in his drug trials* ***D*** *is not correct because lysosome was not extracted from foxglove plants*	**(1)**

Question Number	Answer	Mark
5(b)(i)	**The only correct answer is D 3 only** ***A*** *is not correct because the trial involved intravenous drip with saline solution* ***B*** *is not correct because the trial involved intravenous drip with saline solution* ***C*** *is not correct because the trial involved intravenous drip with saline solution*	**(1)**

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	An answer that makes reference to the following points: • to establish the safest {concentration / dose} (1)	**ACCEPT** to establish lowest effective dose **IGNORE** test {toxicity / safety / side effects} unqualified **ACCEPT** to establish most {suitable / effective} dose with {the least / minimal} side effects **IGNORE** to choose most effective dose	**(1)**

Question Number	Answer	Additional guidance	Mark
5(c)(i)	• {SD / SE / error} bars overlap / same number of patients at day 6 with {sore throat / same mean pain score} (1)		**(1)**

Question Number	Answer	Additional guidance	Mark
5(c)(ii)	A description that makes reference to four of the following points: • use patients with pharyngitis (1) • consideration of {selection / number} of patients (1) • one group given the other antimicrobial drug intravenously and the other group given amoxicillin (1) • correct description of double-blind testing (1) • comparison of relevant data to see if antimicrobial drug was more effective (1)	 **ACCEPT** use people with the *Streptococci* bacterial infection} **IGNORE** patients unqualified e.g. consideration of severity of disease / how long they have had pharyngitis / sex / age / immunocompromised **IGNORE** compare to see which is more effective	**(4)**

Question Number	Answer	Additional guidance	Mark
6(a)	An explanation that makes reference to the following points: • C and D (1) plus one from: • as they are the closest together (on the chromosome) (1) • therefore, least likely to be separated by crossing over / most likely to be exchanged together (1)	both required for the mark **REJECT** other alleles **IGNORE** linkage as all on one chromosome **REJECT** C and D are on same loci **ACCEPT** inherited together unless crossing over occurs	**(2)**

Question Number	Answer	Additional guidance	Mark
6(b)(i)	An explanation that makes reference to the following points: • because multiple alleles result in {increased / different / new} {genotypes / allele combinations / phenotypes / described different phenotype} (1) • because a different allele will code for a different {primary structure / amino acid sequence / polypeptide / protein} • description of how phenotypes would be different for different genotypes (1)	**ACCEPT** result in more phenotypes **ACCEPT** different genotype would result in a different phenotype **ACCEPT** converse for fewer alleles e.g. phenotype different if dominant allele transcribed than if recessive allele transcribed e.g. intermediate phenotype when both alleles transcribed in {co/incomplete} dominance	**(3)**

Question Number	Answer	Additional guidance	Mark
6(b)(ii)	A description that makes reference to two of the following points: • determine number of homozygous recessive phenotypes for this allele in the population (1) • calculate the {dominant / p / recessive / q} allele frequency for this locus (1) • {compare this with / subtract} the previous {allele frequency / frequencies / p / q} to see if there has been a change (1)	**IGNORE** calculate allele frequency unqualified **IGNORE** heterozygosity index **ACCEPT** identify difference between the allele frequencies at two different time points **IGNORE** {see / observe} the change **IGNORE** similarities	**(2)**

Question Number	Answer	Additional guidance	Mark
6(c)	An explanation that includes the following points: • post-transcriptional {modification/change} to pre-mRNA (1) • because all introns {cut out / removed} by spliceosomes for both calcitonin and α-CGRP (1) • exons 5 and 6 are removed for calcitonin whereas no exons removed for α-CGRP (1) • translation occurs forming different {amino acid sequences / primary structure / polypeptide} (1)	**ACCEPT** RNA splicing / alternative splicing **IGNORE** enzymes unqualified **ACCEPT** Calcitonin has a shorter sequence of active mRNA produced / converse for α-CGRP **IGNORE** 1234 / 123456 unqualified **REJECT** exons rearranged in different order **IGNORE** translation forms calcitonin and α-CGRP	**(4)**

Question Number	Answer	Additional guidance	Mark
7(a)(i)	• largest volume of cell calculated (1) • correct increase in volume of cell (1)	<u>Example of calculation:</u> $\frac{4}{3} \times \pi \times (10)^3 = 4188.8$ = 4188.8 − 2000 = 2188.8 = 2189 μm^3 correct answer scores full marks	**(2)**

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	An explanation that includes the following points: • increases number of organelles due to increased {cell activity / protein synthesis / respiration} (1) • sufficient organelles for two daughter cells after cytokinesis (1)	**ACCEPT** increased demand for ATP / proteins / enzymes} **ACCEPT** correct example of a named organelle and function **ACCEPT** 2 daughter cells produced by mitosis / 4 daughter cells produced by meiosis	**(2)**

Question Number	Answer	Additional guidance	Mark
7(a)(iii)	• correct mass of DNA at the end of interphase (1) • correct mass after cytokinesis in one daughter cell in picograms (1)	<u>Example of calculation:</u> (1 ÷ 100) × 6.2 = 0.062 0.031 × 1000 = 31 pg	**(2)**

Question Number	Answer	Additional guidance	Mark
7(b)(i)	• correct measurement of XY in micrometres (1) • correct magnification to two significant figures (1)	<u>Example of calculation:</u> 3.5 × 10 000 = 35 000 35 000 ÷ 94 = ×370 Correct answer on answer line scores full marks	**(2)**

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	An explanation that includes the following points: • the spindle fibres have {decreased in length / shortened} in anaphase (1) • as they pull half of the {chromatids / chromosomes} to each pole of cell (1)	**ACCEPT** tubulin subunits are removed in anaphase **IGNORE** converse for metaphase **ACCEPT** splitting centromere **IGNORE** sister / chromatin	**(2)**

Question Number	Answer	Additional guidance	Mark
7(c)	An answer that includes the following points: • as time increases the mitotic index for {A increases / B does not change} (1) • {cell division / mitosis} is taking place in culture A / no {cell division / mitosis} in culture B (1) • {transcription of gene X is inhibited / gene X is deactivated} due to {histone deacetylation / histone modification / DNA methylation / epigenetic modification} (1) • (therefore) no protein formed from functioning gene X to prevent {cell division / mitosis} (1)	**ACCEPT** epigenetic modification increases mitotic index **ACCEPT** cell cycle {occurs / starts} in A / converse **ACCEPT** epigenetic modification enables mitosis to occur **ACCEPT** heterochromatin prevents the transcription of gene X **ACCEPT** {culture A / modification} has silenced gene X	**(4)**

Question Number	Answer	Mark
8(a)(i)	**The only correct answer is D fusion of a female nucleus and a male nucleus** ***A*** *is not correct because the entry of a sperm cell is not fertilisation* ***B*** *is not correct because the entry of a sperm cell is not fertilisation* ***C*** *is not correct because the fusion of membranes is not fertilisation*	**(1)**

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	An explanation that makes reference to two of the following points: • consider the positive benefits from using the stem cells (1) • consideration of {moral / ethical} issues / complications from use of stem cells in medical therapy (1) • review further research options (1) • influence legislation (1)	**ACCEPT** suitable examples e.g. {replace/repair} damaged tissues / replace damaged cells e.g. use after heart attacks / treat cancer / use in pre-clinical drug trials **IGNORE** medical therapies unqualified **IGNORE** stem cells can differentiate into any other cell **ACCEPT** suitable examples e.g. destruction of embryo / {iPSCs / own stem cells} have fewer ethical issues	**(2)**

Question Number	Answer	Additional guidance	Mark
8(b)	An answer that makes reference to three of the following points: Similarities • both types of twins have cells that {are diploid / have 46 chromosomes} (1) • both types of twins have maternal and paternal {DNA / chromosomes / genes} (1) Differences • monozygotic twins are genetically identical to each other / converse for dizygotic twins (1) • monozygotic twins have the same sex chromosomes / dizygotic twins could have different sex chromosomes (1)	**IGNORE** DNA from same people unqualified **ACCEPT** very {similar / slight differences} in monozygotic genome **IGNORE** come from {same / different} egg cells	**(3)**

Question Number	Answer	Mark
8(c)	**The only correct answer is D characteristic influenced by genes at multiple loci** ***A*** *is not correct because polygenic involves more than one gene* ***B*** *is not correct because polygenic involves more than one gene locus* ***C*** *is not correct because polygenic involves more than one gene*	**(1)**

Question Number	Answer	Additional guidance	Mark
8(d)(i)	An explanation that makes reference to the following points: • correlation coefficient (1) • to establish the {strength / significance} of the {relationship / correlation} between height of twins (1)	**ACCEPT** Pearson's correlation coefficient **IGNORE** Spearman	**(2)**

Question Number	Answer
***8(d)(ii)**	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material indicated as relevant. Additional content included in the response must be scientific and relevant. • monozygotic twins formed from the division of one {fertilised egg cell / zygote} • dizygotic twins formed from two different egg cells, each fertilised by a different sperm cell • different gametes are genetically different due to {meiosis / crossing over / independent assortment} • random fertilisation involved in formation of dizygotic twins • {smaller difference in height / less spread of data} between pairs of monozygotic twins / converse • {stronger correlation / more significant relationship} between height of monozygotic twins / converse • genotype influences the potential height whereas environment influences whether the potential will be reached or not genotype • monozygotic twins are initially genetically identical • differences in genotype expression in monozygotic twins are due to {mutation / epigenetic changes} • dizygotic twins are genetically different / have different genotype • height {is a polygenic characteristic / will show continuous variation} • combination of alleles at different loci will influence the height / one of the twins may inherit a combination which results in {increased / reduced} growth / sex of twins could influence height environment • the heights of both types of twins are affected by environment • examples of how environment can affect height, e.g. {carbohydrate / protein} intake / illness (not genetic) / exercise • explanation of how the factor affects height, e.g. lower protein intake will result in lower {growth / mitosis} / lower carbohydrate intake will result in less ATP available for mitosis **(6)**

Level 0	0	No awardable content
Level 1	1–2	Demonstrates isolated elements of biological knowledge related to the given context with generalised comments made. Vague statements related to consequences are made, with limited linkage to a range of scientific ideas, processes, techniques and procedures. The discussion will contain basic information with some attempt made to link knowledge and understanding to the given context.
Level 2	3–4	Demonstrates adequate knowledge and understanding by selecting and applying some relevant biological facts / concepts. Consequences are discussed which are occasionally supported through linkage to a range of scientific ideas, processes, techniques and procedures. The discussion shows some linkages and lines of scientific reasoning with some structure.
Level 3	5–6	Demonstrates comprehensive knowledge and understanding by selecting and applying relevant knowledge of biological facts / concepts. Consequences are discussed which are supported throughout by sustained linkage to a range of scientific ideas, processes, techniques and procedures. The discussion shows a well-developed and sustained line of scientific reasoning which is clear and logically structured.