



Mark Scheme (Results)

Summer 2026

Pearson Edexcel International Advanced Level in Biology

WBI15/01A

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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	Additional guidance	Mark
1(a)(i)	The correct answer is B dopamine <i>A is not correct because it is not acetylcholine</i> <i>C is not correct because it is not nicotine</i> <i>D is not correct because it is not serotonin</i>		(1)

Question number	Answer	Additional guidance	Mark
1(a)(ii)	L-DOPA/Levodopa	Accept first answer only ACCEPT amphetamine / cocaine / alcohol / nicotine / methamphetamine / Ritalin	(1)

Question number	Answer	Additional guidance	Mark
(1)(b)(i)	The correct answer is A computed tomography (CT) <i>B is not correct because it is not fMRI</i> <i>C is not correct because it is not MRI</i> <i>D is not correct because it is not PET</i>		(1)

Question number	Answer	Additional guidance	Mark
(1)(b)(ii)	The correct answer is C fMRI and PET <i>A is not correct because it is not CT scans</i> <i>B is not correct because it is not MRI</i> <i>D is not correct because it is not MRI</i>		(1)

Question number	Answer	Additional guidance	Mark
(1)(c)	An explanation that includes two of the following points: • axon is no longer insulated (1) • nodes of Ranvier have disappeared (1) • therefore {less / no} saltatory conduction (1)	ACCEPT myelin sheath no longer acts as an insulator ACCEPT {no / less} nodes ACCEPT description of saltatory conduction / fewer impulses transmitted / impulse has to travel the whole length of the axon / impulse cannot travel from node to node	(2)

Question number	Answer	Additional guidance	Mark
(2)(a)(i)	The correct answer is A cerebellum <i>B is not correct because it is not the hypothalamus</i> <i>C is not correct because it is not the medulla oblongata</i> <i>D is not correct because it is not the pituitary gland</i>		(1)

Question number	Answer	Additional guidance	Mark
(2)(a)(ii)	The correct answer is D sensory neurone <i>A is not correct because it is not the motor neurone</i> <i>B is not correct because it is not the receptor</i> <i>C is not correct because it is not the relay neurone</i>		(1)

Question number	Answer	Additional guidance	Mark
(2)(a)(iii)	A calculation showing the following steps: $5600000/100000 \times 4 = 224 \text{ (1)}$ 115 (1)	$5600000/100000 = 56$ $56 \times 4 = 224$ $224 \times 0.51456 = 115.26$ Answer in wrong order of magnitude = 1 mark 115.26 = 1 mark 114 = 1 mark ($\times .51$) Bald answer 115 = 2 marks	(2)

Question number	Answer	Additional guidance	Mark
(2)(b)	A description that includes two of the following points: • radial muscles (in iris) contract (1) • circular muscles (in iris) relax (1) • pupil gets larger (1)	DO NOT ACCEPT radial muscles constrict DO NOT ACCEPT ciliary muscles relax	(2)

Question number	Answer	Additional guidance	Mark
(2)(c)	An answer that includes three of the following points: - rod cells detect {dim light / low light (intensity)} (1) - lack of bleaching of rhodopsin / trans retinal {cannot form / isn't present} (1) - sodium ion channels {remain / stay / kept} open / rod cell remains polarised / no hyperpolarisation (of rod cell / membrane) (1) {no / less} depolarisation of the bipolar cell (1) {no / less} impulses sent via optic nerve to the brain (1)	IGNORE references to cone cells ACCEPT rod cells contain high amounts of rhodopsin / rhodopsin is sensitive to low light intensities ACCEPT sodium ion channels do not close ACCEPT no retinal convergence / {glutamate / inhibitory neurotransmitter} is constantly released preventing action potential in bipolar cell / {no / less} action potentials generated in the bipolar cell	(3)

Question number	Answer	Additional guidance	Mark
(3)(a)	The correct answer is B homeostasis A is not correct because it is not habituation C is not correct because it is not osmoregulation D is not correct because it is not positive feedback		(1)

Question number	Answer	Additional guidance	Mark
(3)(b)	A calculation showing the following steps: • correct values read from graph (1) • $0.04^{\circ}\text{C min}^{-1}$ / $2.4^{\circ}\text{C hr}^{-1}$ (1)	$1.2^{\circ}\text{C} \div \{30 \text{ min} / 0.5 \text{ hours}\}$ temperature drop/length of time = $1.2/30 = 0.04^{\circ}\text{C min}^{-1}$ or $2.4^{\circ}\text{C hr}^{-1}$ Correct units = 1 mark Bald answer $0.04^{\circ}\text{C min}^{-1}$ or $2.4^{\circ}\text{C hr}^{-1}$ = 2 marks	(2)

Question number	Answer	Additional guidance	Mark
(3)(c)	An explanation that includes four of the following points: • both temperatures decrease (1) • temperature falls due to transfer of heat (energy) from skin to the water (1) • thermoreceptors detect {change in / low / decrease in} temperature (1) • (impulses sent to) thermoregulatory control centre / heat {gain / loss} centre • (blood / core) body temperature drops less than skin temperature due to vasoconstriction (1) • {metabolic rate / respiration} increases to maintain (core body / blood) temperature (1) • this is to keep the (core body / blood) temperature in a safe range / negative feedback occurs to keep the (core body / blood) temperature in a narrow range (1)	Piece together marking points 1, 5, 6 and 7 ACCEPT thermoreceptors / temperature sensor / temperature receptor IGNORE thermoregulators IGNORE control centre unqualified ACCEPT a description of diversion of blood away from skin	(4)

Question number	Answer	Additional guidance	Mark
(3)(d)	• correct temperature difference calculated (1) • 2.13 (%) (1)	$38.4 - 37.6 = 0.8$ $(0.8 \div 37.6) \times 100 = 2.12765$ Bald answer 2.13 = 2 marks 2.12765 to incorrect number of decimal places = 1 mark	(2)

Question number	Answer	Additional guidance	Mark
(4)(a)(i)	• there is a positive correlation / there is a non-linear relationship	ACCEPT as the preferred racing distance increases, the percentage of slow twitch fibres increases	(1)

Question number	Answer	Additional guidance	Mark
(4)(a)(ii)	• correlation coefficient		(1)

Question number	Answer	Additional guidance	Mark
(4)(b)	An explanation that includes two of the following points: many capillaries to deliver more {oxygen/glucose} (1) many mitochondria for more {aerobic respiration / ATP production} (1) more myoglobin to store more oxygen (1)	ACCEPT larger capillary network to deliver more {oxygen/glucose} ACCEPT many mitochondria so they do not fatigue easily ACCEPT more myoglobin to release more oxygen at low ppO₂	(2)

Question number	Answer	Additional guidance	Mark
(4)(c)	A description that includes the following points: - as skating distance increases, the percentage of slow twitch muscle fibres increases (1) - non-skaters have a higher percentage of slow twitch muscle fibres than skaters of any distance (1)	ACCEPT converse on both marking points ACCEPT non-skaters have the highest percentage of slow twitch muscle fibres / sprint short distance skaters have the lowest percentage of slow twitch muscle fibres	(2)

Question number	Answer	Additional guidance	Mark
(4)(d)	An explanation that includes three of the following points: • collagen is needed for strength / collagen is strong (1) • collagen levels rise up to age 25 years and fall afterwards (in both skaters and non-skaters) (1) • higher collagen levels (up to 25 years) means injuries {repair / recover} quickly (1) • collagen levels fall faster in skaters than non-skaters (1) • (so lower levels of collagen mean) it takes skaters longer to recover from joint injury (1)	ACCEPT collagen is needed for repair of {tendons / ligaments / cartilage / connective tissues / joints} Piece together ACCEPT lower collagen levels (after 25 years old) means injuries {repair / recover} slower	(3)

Question number	Answer	Additional guidance	Mark
(5)(a)	The correct answer is B P to Q A is not correct because this is contraction of the atria C is not correct because this is the start of ventricular systole D is not correct because this is part of ventricular systole		(1)

Question number	Answer	Additional guidance	Mark
(5)(b)	An answer that includes the following points: • calculation of correct heart rate (1) • yes, because their heart rate is less than 60 bpm (1)	$60/1.4 = 42.86 / 43$ or $60 / 1.44 = 41.67 / 42$ ALLOW ECF on incorrectly calculated heart rate as long as conclusion about bradycardia is correct	(2)

Question number	Answer	Additional guidance	Mark
(5)(c)(i)	The correct answer is B 0.54 : 1 A <i>0.35 : 1 is incorrect because $19 : 35 = 0.54 : 1$</i> C <i>0.65 : 1 is incorrect because $19 : 35 = 0.54 : 1$</i> D <i>1.84 : 1 is incorrect because $19 : 35 = 0.54 : 1$</i>	$19 : 35 = 0.54285 : 1$	(1)

Question number	Answer	Additional guidance	Mark
(5)(c)(ii)	An explanation that includes three of the following points: • reduced blood flow from the left ventricle flows to cardiac muscle (1) • (reduced blood flow) reduces oxygen supply to cardiac muscle (1) • causes an increase in anaerobic respiration / reduces aerobic respiration (1) • some of the cardiac muscle dies (1)	ACCEPT heart instead of cardiac throughout ACCEPT reduced blood flow to coronary artery ACCEPT causes a build-up of lactic acid ACCEPT causes a heart attack / myocardial infraction IGNORE increases risk of coronary heart disease	(3)

Question number	Answer	Additional guidance	Mark
(5)(c)(iii)	An answer that includes four of the following points: Yes because: - it might cause {footballers / players / men / athletes} to {check with their doctor / get tested / gain awareness of the conditions} (1) - it would be useful for other footballers (1) - footballers are professional athletes so likely to see similar patterns in other athletes (1) - other athletes of similar age could find the data helpful (1) - it could help treat previously undiagnosed health conditions (1) No because: - all the footballers were male (1) - this is only a small sample (1) - all footballers were around the same age (1) - there may be other risk factors (1) - only useful for football (1)	Max 2 marks from one section ACCEPT it might cause {footballers / players / men / athletes} to get screened ACCEPT athletes are likely to have similar body condition ACCEPT other male athletes could find the data helpful ACCEPT data cannot be used for older or younger people ACCEPT do not know what other variables were controlled in the experiment / names example of something not known eg a diet, health, genetic conditions etc. ACCEPT other sports have different {intensities / training programmes} to football	(4)

Question number	Answer	Additional guidance	Mark
(6)(a)	reverse transcriptase		(1)

Question number	Answer	Additional guidance	Mark
(6)(b)	A description that includes four of the following points: - gene(s) for vaccine isolated (1) - using {restriction / endonuclease} enzyme - method of inserting gene(s) into {plasmid / virus / vector} (1) - method of inserting vector into the crop plant described (1) (grow the crop and) select the modified crop plants with the antigens (1)	ACCEPT extracted / cut out / removed DO NOT ACCEPT RE e.g. same restriction enzyme used to cut plasmid / use of ligase to bind complementary sticky ends / removal of virus genetic information ACCEPT a named vector e.g. plasmid, liposomes e.g. gene gun, electroporation, virus infection of plant using the genetic material, heat-shock / infect crop plant with bacteria / plasmid	(4)

Question number	Answer	Additional guidance	Mark
(6)(c)	Indicative content Advantages in table (1): Potato: • can be stored for long periods / it lasts for a long time • lower cost storage as no refrigerator needed • successful against two types of virus • already part of human and animals diet / could be used to human and animal vaccination (credit only once) Banana: • doesn't need cooking / easy to ingest the vaccine • already part of human and animals diet / could be used to human and animal vaccination (credit only once) Maize: • successful against three types of virus • already part of human and animals diet / could be used to human and animal vaccination (credit only once) • doesn't need cooking / easy to ingest the vaccine Disadvantages in table (2): Potato: • cooking may denature proteins / antigens may be destroyed • cooking requires more resources so less likely to be given to animals Banana: • only lasts six days / short storage time • only successful against one virus Maize: • cannot be stored for long without a refrigerator • costs more to store if using refrigerator	Ignore descriptions of data ACCEPT any other reasonable suggestion Level 1: 1 mark = one advantage and one disadvantage 2 marks = three advantages and disadvantages (at least one of each) Level 2: 3 marks = four advantages and disadvantages covering at least two different categories (table, graph, general knowledge) with at least one advantage and one disadvantage 4 marks = five advantages and disadvantages covering at least two different categories (table, graph, general knowledge) with at least one advantage and one disadvantage Level 3: 5 marks = six advantages and disadvantages covering all three different categories (table, graph and general knowledge) and commenting on all three food types with at least one advantage and one disadvantage 6 marks = seven advantages and disadvantages covering all three different categories (table, graph and general knowledge) and commenting on all three food types with at least two advantages and two disadvantages from each category	(6)

	Advantages on graph (3): • China and India already produce all three crops • Most countries grow maize already (Argentina, Brazil, China, India, USA) • maize is already produced in great quantities • countries already growing maize would have access to three vaccinations Disadvantages on graph (4): • only China and India already produce all three crops • HIV and rabies vaccines only available in some countries • vaccines only available in countries able to grow the crop • few countries grow bananas • Indonesia and Ecuador only grow few bananas so would not have easy access to vaccines / only access to Hep B • China biggest crop producer = cause high transport costs General knowledge advantages (5): • needles not required to administer vaccine / vaccine easy to take – can be eaten • doctors/specialised health professionals not needed to administer the vaccine • vaccines could be readily available in countries without developed healthcare General knowledge disadvantages (6): • issues with the dosage – how much to eat? • all the vaccines are for viruses • there could be mutations in the genome of the plants • genes could be transferred to other plants / cross-breeding / horizontal gene transfer / accumulation of GM material in other species • vaccines may not work against all strains of the diseases • could be side effects with eating these altered crops / unknown long-term effects of GMOs • could increase the cost of crops / expensive to produce GM crops		
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Question number	Answer	Additional guidance	Mark
(6)(d)	An answer that includes the following points: • damage to vaccine by digestive process described (1) • {no / only a little is} vaccine absorbed into the blood stream (1) • dosage might be too low (1)	Eg {vaccine / antigen} is broken down by enzymes, {vaccine / antigen} is {damaged / denatured} by stomach acid ACCEPT ideas of cooking damaging the vaccine IGNORE vaccine is digested ACCEPT mixing vaccine with foods might reduce the effectiveness ACCEPT concentration of {vaccination / antigen} might be too low DO NOT ACCEPT amount of {vaccination / antigen} might be too low	(2)

Question number	Answer	Additional guidance	Mark
(7)(a)(i)	The correct answer is D ultrafiltration <i>A is not correct because it is not active transport</i> <i>B is not correct because it is not diffusion</i> <i>C is not correct because it is not the ornithine cycle</i>		(1)

Question number	Answer	Additional guidance	Mark
(7)(a)(ii)	An explanation that includes two of the following points: • efferent arteriole has a smaller diameter than the afferent arteriole to generate high pressure (1) • basement membrane acts as a barrier to prevent blood proteins passing through / {fenestrations / podocytes} allow passage of small soluble molecules into filtrate (1) • capillaries provide a large surface area (for ultrafiltration to occur) (1)	ACCEPT afferent arteriole has a greater diameter than the efferent arteriole to generate a high pressure ACCEPT {basement membrane / fenestrations / podocytes} contributes towards selective permeability	(2)

Question number	Answer	Additional guidance	Mark
(7)(b)(i)	• correct named substance	glucose amino acids water sodium ions potassium ions	(1)

Question number	Answer	Additional guidance	Mark
(7)(b)(ii)	An explanation that includes three of the following points: • less aerobic respiration / oxidative phosphorylation (1) • due to fewer electron carriers (1) • and less ATP synthase (1) • less ATP produced (1) • resulting in less active transport of {molecules / glucose / amino acids} (1)	ACCEPT fewer electrons moving in electron transport chain IGNORE ATPase ACCEPT less ADP and Pi converted to ATP / less phosphorylation of ADP ACCEPT less sodium ions pumped for co-transport of {molecules / glucose / amino acids}	(3)

Question number	Answer	Additional guidance	Mark
7(c)(i)	An explanation that includes three of the following points: • cisplatin and control have very similar concentrations of urea in the blood up to day 14 (1) • {overall / increased time} using cisplatin results in an increased concentration of urea in the blood (after day 14) (1) • from day 14 – 28 mice with cisplatin have a rapid increase in the concentration of urea in the blood (1) • after day 14 mice with cisplatin have more kidney damage than the control (1) • increased damage to proximal tubule will result in higher concentrations of urea in the blood (indicating kidney damage) (1)	ACCEPT error bars overlap day 0 and 14 ACCEPT cisplatin mice have a higher concentration of urea in their blood than the control (except day 14) ACCEPT error bars do not overlap after day 14	(3)

Question number	Answer	Additional guidance	Mark
7(c)(ii)	An answer that includes three of the following points: - the graph indicates that there is damage to the kidney (because of the urea concentration) (1) - humans (and mice) are mammals so the drug may have similar effect (1) - but dose given to humans would be different (1) - stated issue with the experiment procedure (1) - some error bars overlap until day 14 so any differences until this point may not be significant (1)	ACCEPT mice are not humans so drug might have a different effect on humans ACCEPT we do not know the dose given to the mice e.g. no indication of sample size, all mice were male, no indication of mice ages, no indication of control variables ACCEPT error bars do not overlap {after day 14 / from day 21} so any differences are significant	(3)

Question number	Answer	Additional guidance	Mark
8(a)	prevent the generation of action potentials	ACCEPT prevent the influx of sodium ions / prevent depolarisation / prevent transmission of impulses	(1)

Question number	Answer	Additional guidance	Mark
8(b)	An explanation that includes four of the following points: - VX-548 blocks {over 80% / 84%} of sodium channels (1) - lidocaine also blocks {over 80%/ 84%} of channels but is not selective (1) - VX-548 only blocks peripheral nerve cells / lidocaine and lamotrigine block all types of sodium channels (1) {less / no} sodium ions move (in through voltage gated channels) (1) (sensory neurones) {less likely / not} depolarised / threshold potential {less likely to be / not} reached (1) {less / no} action potentials produced (1)	ACCEPT VX-548 blocks the {higher / highest} percentage of sodium channels (compared to Mexiletine and Lamotrigine) ACCEPT VX-548 only blocks sodium channels / VX-548 only blocks {one / specific / NAV1.7} channel ACCEPT {less / no} impulses sent to the brain	(4)

Question number	Answer	Additional guidance	Mark
8(c)	An explanation that includes the following points: (drugs) could increase serotonin levels (1) - because serotonin is not broken down / {SSRIs / drugs} prevent the reuptake of serotonin (1)	ACCEPT (drugs) cause a {high concentration / accumulation} of serotonin ACCEPT drugs cause the {release / production} of serotonin / MDMA prevents the reuptake of serotonin	(2)

Question number	Answer	Additional guidance	Mark
8(d)	An answer that includes two of the following points: - the aspirin is {pure / not contaminated} (1) - so an accurate dose can be administered (1) - no steps needed in processing / no trees need to be destroyed (1) - it can be made anywhere in the world / produced in greater supply (1)	ACCEPT converse on all marking points ACCEPT named contaminants IGNORE safer ACCEPT prevents deforestation ACCEPT produced with a higher yield	(2)

Question number	Answer	Additional guidance	Mark
8(e)	An answer that includes three of the following points: - it blocks sodium ion channels (1) - raising the depolarisation threshold / preventing the influx of sodium ions (1) - fewer action potentials sent across cardiac muscle / less frequent depolarisation of cardiac muscle / less impulses sent across cardiac muscle (1) - heart less likely to have {arrythmia / abnormal heartbeat} / reduces abnormal electrical activity (1)	Penalise lack of sodium ions only once. IGNORE binds to sodium ion channels ACCEPT bundles of His, SAN, AVN, Purkyne fibres instead of cardiac muscle ACCEPT no action potentials sent across cardiac muscle / no depolarisation of cardiac muscle / no impulse sent across cardiac muscle ACCEPT atria and ventricles contract in the correct sequence	(3)

Question number	Answer	Additional guidance	Mark
8(f)	An answer that includes two of the following points: • they produced (too many) side effects (1) • they could not establish the correct dose (1) • they could not get the funding (1)	ACCEPT the drugs might not reduce pain / the drugs are not effective	(2)

Question number	Answer	Additional guidance	Mark
8(g)	An answer that includes two of the following points: • they could {block / bind to} the receptors (1) • they could prevent the release of the neurotransmitter (1) • they block synthesis of the neurotransmitter (1) • {no action potentials / nerve impulses / signals} in <u>sensory</u> neurones (1)	ACCEPT they could damage pain receptors ACCEPT they could {block / bind to} the sodium ion channels ACCEPT break down neurotransmitters ACCEPT destroy myelin sheath to prevent {action potential / nerve impulse / signals}	(2)

Question number	Answer	Additional guidance	Mark
8(h)	An explanation that includes four of the following points: • (pain channel) gene less likely to {be transcribed / produce mRNA} (1) • results in less {translation / translation of mRNA} (1) • less {pain channels / sodium (ion) channels} formed (1) • (therefore fewer channels) so less sodium ions to move in (1) • therefore {fewer / no} action potentials (leading to pain) (1)	DO NOT ACCEPT 'no' instead of 'less likely' for mp 1, 2, 3 and 4. Penalise 'no' instead of 'less' once only. ACCEPT less NAV1.7 channel protein formed ACCEPT less sodium ion influx ACCEPT therefore {fewer / no} impulses along axon (leading to pain) / {less / no} depolarisation (so no feelings of pain)	(4)