

Edexcel IAL Biology: **Edexcel IAL Biology October 2022 Question paper WBI15**

1(a)(i)	B is the correct answer - A is not the correct answer as actin does not join bone to bone - C is not the correct answer as muscle does not join bone to bone - D is not the correct answer as tendon does not join bone to bone	Computer (1)
1(b)(i)	An explanation that includes two of the following points: - muscles are in antagonistic pairs / have extensor and flexor muscles (1) - the muscles contract (with equal strength) (1) - ligaments hold the joint in place (1)	muscles if named - rectus femoris and gastrocnemius / fibialis accept muscles work antagonistically ignore one contracts and the other relaxes accept ligaments hold the bones in place Expert (2)

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2(c)	An answer that includes the following points: - exercise increases the rate of heat loss (1) (eventually) the rate of heat loss reaches its maximum (1)	ACCEPT the rate of heat loss levels off	(2)
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Edexcel IAL Biology: **Edexcel IAL Biology June 2023 Question paper WBI15**

3(a)(i)	Choose an item. B is the correct answer A is not the correct answer as cytoplasm is not the site of the ETC C is not the correct answer as mitochondrial matrix is not the site of the ETC D is not the correct answer as outer mitochondrial membrane is not the site of the ETC		Computer (1)
3(a)(ii)	Choose an item. D is the correct answer A is not the correct answer as a carbohydrate is not an enzyme in the production of ATP B is not the correct answer as a lipid is not an enzyme in the production of ATP C is not the correct answer as a phospholipid is not an enzyme in the production of ATP		Computer (1)

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3(b)(i)	An answer that includes the following points: - less ATP produced (1) (because) haemoglobin cannot transport (as much) oxygen / {prevents / reduces} oxygen binding to haemoglobin (1) (therefore) so cells have {no / less} final electron acceptor (1)	may give numbers 2:36 accept binds to haemoglobin instead of oxygen accept haemoglobin has a higher affinity for CO than oxygen accept aerobic respiration can't occur / less aerobic respiration do not accept anaerobic respiration on its own – it needs linking to ATP accept (more) anaerobic respiration occurs which produces fewer ATP molecules (per glucose) for 2 marks	Expert (3)
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3(b)(ii)	An explanation that includes the following points: - anaerobic respiration involves (just) glycolysis / ATP produced during glycolysis (1) - anaerobic respiration occurs in cytoplasm / anaerobic respiration doesn't involve the {mitochondria/ETC}	accept substrate level phosphorylation for glycolysis accept ATP is produced when glucose is converted to pyruvate	Expert (2)
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Question number	Answer	Additional guidance	Mark
3(a)	An answer that includes two of the following points: - TB - Cystic Fibrosis - Asthma - COPD - Lung cancer - emphysema - bronchitis	examiners to check other alternatives Covid long covid pneumonia pulmonary fibrosis accept any named respiratory disease	Expert (2)

Question number	Answer	Additional guidance	Mark																				
3(b)(i)	An answer that includes three of the following points: - as body mass increases the (mean resting) ventilation rate decreases / inverse relationship / negative correlation (1) - comment on the small number of {animals / species/ sample size} (1) - correlation doesn't imply causation / other aspects affect resting ventilation rate (1) - appropriate comment on standard deviations (1)	accept converse accept significant (difference) between xxx and xx because SDs do not overlap not a significant (difference) between xxx and xxx because SDs do overlap SD values are small which indicates higher {validity/reliability} don't accept {overlapping / not overlapping} SDs are (not significant / significant) unqualified ignore not-overlapping /overlapping unqualified? <table border="1"> <tr><td>talapoin</td><td>0.45</td><td>0.54</td><td>0.63</td></tr> <tr><td>lemur</td><td>0.49</td><td>0.53</td><td>0.57</td></tr> <tr><td>porcupine</td><td>0.27</td><td>0.30</td><td>0.33</td></tr> <tr><td>tiger</td><td>0.21</td><td>0.27</td><td>0.33</td></tr> <tr><td>hippo</td><td>0.09</td><td>0.12</td><td>0.15</td></tr> </table>	talapoin	0.45	0.54	0.63	lemur	0.49	0.53	0.57	porcupine	0.27	0.30	0.33	tiger	0.21	0.27	0.33	hippo	0.09	0.12	0.15	Expert (3)
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Question number	Answer	Additional guidance	Mark
3(b)(ii)	A calculation showing the following steps: - calculation of number of breaths per minute (1) - calculation of tidal volume in dm³ and answer given to 2 significant figures (1)	(0.54 x 60) = 32.4 (32.4 x 0.04) = 1.3 dm ³ include the other way round e.g. 0.54x0.04 = 21.6 (21.6 x 60) = 1.3 dm ³ correct answer scores full marks 1.30 = 1 mark only 12960/1296/ 1.296 / 32.4 / 21.6 / (0.54 x 60) / (0.54x0.04)/ (0.54 x 40/1000) somewhere = 1 mark no ecf	Graduate (2)

number	Answer	Additional guidance	Mark
3(c)	A description that includes four of the following points: (because) increase {activity/ aerobic respiration} leads to an {increase in carbon dioxide /decrease in pH}(1) - which is detected by chemoreceptors (1) (which causes transmission of) impulses to the {respiratory centre / medulla (oblongata)} (1) - which (increases) impulses (via SNS) to increase contraction of {breathing / intercostal / diaphragm} muscles (1) - increase in ventilation rate (1)	do not accept signals or messages for impulses accept impulses to ventilation centre accept impulses (via SNS) for further contraction of {breathing / intercostal / diaphragm} muscles accept increase breathing rate	Expert (4)

Question number	Answer	Additional guidance	Mark
4(a)	Choose an item. B is the correct answer A is not the correct answer as only one statement is correct C is not the correct answer as only one statement is correct D is not the correct answer as only one statement is correct		Computer (1)

Question number	Answer	Additional guidance	Mark
4(b)(ii)	A calculation showing the following steps: - calculation of magnification (1) - answer given in standard form (1)	= 15500 (accept 15000-16000) = 1.55×10^4 accept 1.5×10^4 - 1.6×10^4 factor of 10 error 1 mark if not in standard form 15000-16000 gains 1 mark	Graduate (2)

Question number	Answer	Additional guidance	Mark
4(b)(iii)	A description that includes four of the following points: - fast twitch have fewer {capillaries / blood vessels} (1) - fast twitch have fewer mitochondria (1) - fast twitch have less myoglobin (1) - fast twitch are {larger in diameter/ longer / have more sarcoplasmic reticulum} (1) - have more {glycogen / creatine phosphate} (1)	ALLOW converse ignore less blood supply as not structural	Expert (4)

Question number	Answer	Additional guidance	Mark
4(c)	An explanation that includes the following points: - increase in velocity of contraction decreases the force of contraction (1) (cross bridges) are formed when myosin (head) binds to {actin / myosin binding site (on actin)} / (cross bridge) are broken when ATP binds to the myosin (head) (1) - therefore reducing the total number of cross bridges (at any one time) (1)	accept slower muscle contractions have more force / converse accept inversely proportional / negative correlation accept description of a cross bridge forming accept there are more cross bridges formed in slow contraction / there are fewer cross bridges formed in fast contractions accept converse	Expert (3)

Question number	Answer	Additional guidance	Mark
5(a)(i)	Choose an item. B is the correct answer A is not the correct answer as glucose and prothrombin are not filtered from the blood in the renal capsule C is not the correct answer as glycogen and urea are not filtered from the blood in the renal capsule D is not the correct answer as urea and prothrombin are not filtered from the blood in the renal capsule		Computer (1)

	{ fluid / filtrate } (in the two limbs of the loop of Henle) moves in opposite directions (1) (sodium / potassium / chloride) ions move out of ascending limb (into surrounding fluid) (1) (ions move) by active transport (1) (resulting in) increase in {(ion) concentration / decrease in water potential} (of surrounding fluid) (1) (therefore) water leaves {the descending limb / by osmosis / through aquaporins} (1)	accept symbols for ions eg Na⁺ do not accept sodium accept idea of active transport – / actively pumped / pumped / moved actively can get this even if the ions were pumped in wrong direction accept (surrounding) fluid becomes hypertonic accept a (water / ion / solute) concentration gradient formed accept there is a greater (solute) concentration outside the base of the descending limb accept diffusion of water accept (because) the descending limb is permeable to water accept the ascending limb is impermeable to water	(4)
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number			
5(c)(i)	A calculation showing the following steps: - correct readings from the graph for the three sets of females put into a ratio (1) - calculation of ratio to 1 significant figure (1)	100:840:440 in working = 1 mark 1:8:4 = 2 marks 1:8.4:4.4 = 1 mark	Graduate (2)

number			
5(c)(iii)	An explanation that includes two of the following points: - increased water {potential / concentration} (of blood) (1) - ADH not released / less ADH released (1) - decreased permeability of walls of {distal convoluted tubule / collecting duct} to water (1) - less reabsorption of water (into blood) (1)	ALLOW reference to detected by osmoreceptors allow increased water in blood ignore loop of Henle	Expert (2)

3	consideration of concentration or distribution of two or more ions using the graph / data
3,	- consideration of role of Na⁺ in the human body (linked to comment about relative concentration) - role in muscle contraction / role in nerve impulse / role in water balance as an electrolyte accept any correct stated role for Na⁺
	- consideration of role of K⁺ in the human body (linked to comment about relative concentration) - role in nerve impulse / role in muscle contraction / role in active transport / role in protein synthesis / role in activation of some enzymes

(i)	An answer that includes the following point: D is the correct answer - A is not the correct answer as myoglobin is not an enzyme - B is not the correct answer as myoglobin is not part of the sarcolemma - C is not the correct answer as myoglobin does not act as an immediate source of energy	(1)
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points:		(3)
• as sprinting demand fast speed (over a short distance/ in a short time) (1) • because fast twitch fibres contract more quickly (than slow twitch) (1) • because fast twitch rely on anaerobic respiration (to supply the energy for contraction) (1)	accept fast / quick accept contraction of fast twitch fibres does not rely on a supply of oxygen	