

Revision Sheet

Pearson Edexcel · International A-Level · Biology · Unit 5 Respiration, Internal Environment, Coordination and Gene Technology

19 vocabulary items · 34 marks of exam questions (4 questions)

Part 1 · Vocabulary review answer key. Section A wants the exact English spelling.

Question	Answer	Marks
1	actin	1
2	ADH	1
3	Adrenaline	1
4	Auxin	1
5	collecting duct	1
6	dopamine	1
7	Habituation	1
8	insulin	1
9	Krebs cycle	1
10	lactate	1
11	ligament	1
12	medulla oblongata	1
13	myelinated	1
14	myosin	1
15	nephron	1
16	Phytochrome	1
17	pituitary	1
18	tendon	1
19	urea	1

20(a)(i)	<p>B is the correct answer</p> <ul style="list-style-type: none"> 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)
20(b)(i)	<p>An explanation that includes two of the following points:</p> <ul style="list-style-type: none"> 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) 	<p>muscles if named - rectus femoris and gastrocnemius / fibialis accept muscles work antagonistically</p> <p>ignore one contracts and the other relaxes</p> <p>accept ligaments hold the bones in place</p> <p>Expert (2)</p>

21(c)	<p>An answer that includes the following points:</p> <ul style="list-style-type: none"> exercise increases the rate of heat loss (1) (eventually) the rate of heat loss reaches its maximum (1) 	<p>ACCEPT the rate of heat loss levels off</p> <p>(2)</p>
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22(a)(i)	<p>Choose an item.</p> <ul style="list-style-type: none"> B is the correct answer <p>A is not the correct answer as cytoplasm is not the site of the ETC</p> <p>C is not the correct answer as mitochondrial matrix is not the site of the ETC</p> <p>D is not the correct answer as outer mitochondrial membrane is not the site of the ETC</p>	Computer (1)
22(a)(ii)	<p>Choose an item.</p> <ul style="list-style-type: none"> D is the correct answer <p>A is not the correct answer as a carbohydrate is not an enzyme in the production of ATP</p> <p>B is not the correct answer as a lipid is not an enzyme in the production of ATP</p> <p>C is not the correct answer as a phospholipid is not an enzyme in the production of ATP</p>	Computer (1)

22(b)(i)	<p>An answer that includes the following points:</p> <ul style="list-style-type: none"> 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) 	<p>may give numbers 2:36</p> <p>accept binds to haemoglobin instead of oxygen</p> <p>accept haemoglobin has a higher affinity for CO than oxygen</p> <p>accept aerobic respiration can't occur / less aerobic respiration</p> <p>do not accept anaerobic respiration on its own – it needs linking to ATP</p> <p>accept (more) anaerobic respiration occurs which produces fewer ATP molecules (per glucose) for 2 marks</p>	<p>Expert</p> <p>(3)</p>
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22(b)(ii)	<p>An explanation that includes the following points:</p> <ul style="list-style-type: none"> anaerobic respiration involves (just) glycolysis / ATP produced during glycolysis (1) anaerobic respiration occurs in cytoplasm / anaerobic respiration doesn't involve the {mitochondria/ETC} 	<p>accept substrate level phosphorylation for glycolysis</p> <p>accept ATP is produced when glucose is converted to pyruvate</p>	<p>Expert</p> <p>(2)</p>
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Question number	Answer	Additional guidance	Mark
3(a)	<p>An answer that includes two of the following points:</p> <ul style="list-style-type: none"> • TB • Cystic Fibrosis • Asthma • COPD • Lung cancer • emphysema • bronchitis 	<p>examiners to check other alternatives</p> <p>Covid long covid pneumonia pulmonary fibrosis accept any named respiratory disease</p>	Expert (2)

Question number	Answer	Additional guidance	Mark																				
3(b)(i)	<p>An answer that includes three of the following points:</p> <ul style="list-style-type: none"> • 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) 	<p>accept converse</p> <p>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}</p> <p>don't accept {overlapping / not overlapping} SDs are (not significant / significant) unqualified ignore not-overlapping /overlapping unqualified?</p> <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)	<p>A calculation showing the following steps:</p> <ul style="list-style-type: none"> • calculation of number of breaths per minute (1) • calculation of tidal volume in dm^3 and answer given to 2 significant figures (1) 	<p>$(0.54 \times 60) = 32.4$</p> <p>$(32.4 \times 0.04) = 1.3 \text{ dm}^3$</p> <p>include the other way round e.g. $0.54 \times 0.04 = 21.6$ $(21.6 \times 60) = 1.3 \text{ dm}^3$</p> <p>correct answer scores full marks</p> <p>1.30 = 1 mark only</p> <p>12960/1296/ 1.296 / 32.4 / 21.6 / $(0.54 \times 60) / (0.54 \times 0.04) /$ $(0.54 \times 40/1000)$ somewhere = 1 mark no ecf</p>	<p>Graduate</p> <p>(2)</p>

number			
3(c)	<p>A description that includes four of the following points:</p> <ul style="list-style-type: none"> • (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) 	<p>do not accept signals or messages for impulses</p> <p>accept impulses to ventilation centre</p> <p>accept impulses (via SNS) for further contraction of {breathing / intercostal / diaphragm} muscles</p> <p>accept increase breathing rate</p>	<p>Expert</p> <p>(4)</p>

Question number	Answer	Additional guidance	Mark
4(a)	<p>Choose an item.</p> <ul style="list-style-type: none"> • B is the correct answer <p>A is not the correct answer as only one statement is correct</p> <p>C is not the correct answer as only one statement is correct</p> <p>D is not the correct answer as only one statement is correct</p>		<p>Computer</p> <p>(1)</p>
4(b)(ii)	<p>A calculation showing the following steps:</p> <ul style="list-style-type: none"> • calculation of magnification (1) • answer given in standard form (1) 	<p>= 15500 (accept 15000-16000)</p> <p>= 1.55×10^4</p> <p>accept 1.5×10^4 - 1.6×10^4</p> <p>factor of 10 error 1 mark</p> <p>if not in standard form 15000-16000 gains 1 mark</p>	<p>Graduate</p> <p>(2)</p>

number			
4(b)(iii)	<p>A description that includes four of the following points:</p> <ul style="list-style-type: none"> 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) 	<p>ALLOW converse</p> <p>ignore less blood supply as not structural</p>	<p>Expert</p> <p>(4)</p>

Question number	Answer	Additional guidance	Mark
4(c)	<p>An explanation that includes the following points:</p> <ul style="list-style-type: none"> 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) 	<p>accept slower muscle contractions have more force / converse</p> <p>accept inversely proportional / negative correlation</p> <p>accept description of a cross bridge forming</p> <p>accept there are more cross bridges formed in slow contraction / there are fewer cross bridges formed in fast contractions</p> <p>accept converse</p>	<p>Expert</p> <p>(3)</p>

Question number	Answer	Additional guidance	Mark
5(a)(i)	<p>Choose an item.</p> <ul style="list-style-type: none"> B is the correct answer <p>A is not the correct answer as glucose and prothrombin are not filtered from the blood in the renal capsule</p> <p>C is not the correct answer as glycogen and urea are not filtered from the blood in the renal capsule</p> <p>D is not the correct answer as urea and prothrombin are not filtered from the blood in the renal capsule</p>		<p>Computer</p> <p>(1)</p>

	<ul style="list-style-type: none"> {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) 	<p>accept symbols for ions eg Na⁺ do not accept sodium</p> <p>accept idea of active transport – / actively pumped / pumped / moved actively can get this even if the ions were pumped in wrong direction</p> <p>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</p> <p>accept diffusion of water accept (because) the descending limb is permeable to water accept the ascending limb is impermeable to water</p>	(4)
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number			
5(c)(i)	<p>A calculation showing the following steps:</p> <ul style="list-style-type: none"> correct readings from the graph for the three sets of females put into a ratio (1) calculation of ratio to 1 significant figure (1) 	<p>100:840:440 in working = 1 mark</p> <p>1:8:4 = 2 marks</p> <p>1:8.4:4.4 = 1 mark</p>	<p>Graduate</p> <p>(2)</p>

number			
5(c)(iii)	<p>An explanation that includes two of the following points:</p> <ul style="list-style-type: none"> 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) 	<p>ALLOW reference to detected by osmoreceptors allow increased water in blood</p> <p>ignore loop of Henle</p>	<p>Expert</p> <p>(2)</p>

22	<ul style="list-style-type: none"> consideration of concentration or distribution of two or more ions using the graph / data
3,	<ul style="list-style-type: none"> 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 <p>accept any correct stated role for Na⁺</p>
	<ul style="list-style-type: none"> 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

5)(i)	<p>An answer that includes the following point:</p> <p>D is the correct answer</p> <ul style="list-style-type: none"> 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:

- 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

(3)