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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Biology 5416

Specification B

BYB3/W Physiology and Transport

Mark Scheme

2007 examination - June series

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Question	Part	Sub Part	Marking Guidance	Mark	Comments
1	a		More or thick(er) muscle/elastic tissue /small(er) lumen;	1	**X** (no mark) Accept fibres for tissue
1	b		1) Contain (semilunar/pocket) valves; 2) (valves) work in one direction only/explanation of valve action;	1 1	Ref to blood flow neutral Ref to AV/mitral etc loses first mark Explanation must be linked to valve
1	c	i	**C**;	1	
1	c	ii	**A** and/or **B**;	1	
1	c	iii	**E**;	1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
2	a		1) Seal has more enzyme **M**/enzyme for anaerobic respiration; 2) so <u>more</u> anaerobic respiration; 3) when <u>oxygen</u> limiting (diving);	1 1 1	
2	b		Glycogen;	1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
3	a		1) (Hydrostatic/blood) pressure is low(er) (at venous end of capillary);	1	3 max
			2) lower/more negative water potential in capillary;	1	Accept solute potential
			3) due to blood/plasma proteins;	1	
			4) (it) returns by osmosis /diffusion;	1	
			5) (it) returns to blood via lymph vessels;	1	
3	b		1) Swelling caused by fluid build up;	1	
			2) because fluid cannot be drained (into lymph vessels);	1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
4	a	i	Factor and explanation e.g. **Temperature (no mark)** Higher temperature give molecules more kinetic energy; increase rate of evaporation; **Air movement (no mark)** In still air a layer of water vapour build up around stomata/reduces W.P. gradient; reduces the rate of evaporation; **Humidity (no mark)** High humidity reduces the water potential gradient; reduces the rate of evaporation; **Light (intensity) (no mark)** High light (intensity) causes stomata to open; increases rate of transpiration;	 1 1 OR 1 1 OR 1 1 OR 1 1	2 max Accept Transpiration instead of Evaporation Reject “Water lost”
4	a	ii	1) **T**; 2) Via calculation rate = $\frac{40}{30}$ = 1.33 $mm^3\ cm^{-2}\ min^{-1}$;	1 1	
4	a	iii	1) **S**; 2) Will lose least volume of water per unit area of leaf;	1 1	

4	b		1) K^+ (ions/chloride) cause stomata to open/ Na^+ (ions/chloride) cause stomata to close;	1	3 max
			2) more K^+ (ions/chloride) in (guard) cells/ Less Na^+ (ions/chloride) in (guard) cells;	1	
			3) K^+ (ions/chloride) lowers water potential inside/ Na^+ (ions/chloride) lowers water potential outside;	1	
			4) different (guard) cell wall thickness causes opening (of stomata);	1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
5	a	i	Sinoatrial node/SAN;	1	Accept pacemaker
5	a	ii	1) Produces impulses;	1	2 max
			2) (impulses) travel to AVN/ down bundle of His;	1	
			3) causing (muscle) contraction;	1	
			4) output modified by medulla/ sympathetic/ parasympathetic;	1	
5	b		NKLJF / KLNJF;	1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
6	a		12800 ; 800 = 16;	1 1	Award 1 mark for correct denominator or numerator
6	b		1) Heart or muscles need more energy/more contractions; 2) increased blood flow (to heart and/or muscles); 3) more O_2 for aerobic respiration/delays anaerobic respiration/prevents lactate build up; 4) aerobic respiration produces more ATP/releases more energy; 5) waste products removed faster; 6) less blood flow to liver as blood diverted to muscle;	1 1 1 1 1 1	4 max

Question	Part	Sub Part	Marking Guidance	Mark	Comments
7	a	i	Phloem;	1	
7	a	ii	Xylem;	1	
7	b	i	1) Sucrose made in leaves/by photosynthesis/from breakdown of storage compounds; 2) (Sucrose) actively transported into phloem; 3) by companion/transfer cells: 4) water potential decreases; 5) water enters by osmosis; 6) hydrostatic pressure increases; 7) In growing areas/sinks /storage areas sucrose is removed;	1 1 1 1 1 1 1	4 max
7	b	ii	1) (Sucrose) must travel through the apoplast; 2) when <u>PCMBS added</u> (rate of) sucrose transport decreased;	1 1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
8	a		1) Partial pressure of oxygen is high in lungs;	1	6 max
			2) (O_2) binds to Hb;	1	
			3) forms oxyhaemoglobin(HbO_8);	1	Accept HbO_2
			4) in red blood cells;	1	
			5) Hb has a high affinity for oxygen;	1	
			6) dissociation occurs when partial pressure of O_2 is low;	1	Accept "unloading" for "dissociation"
			7) dissociation is <u>increased</u>/ <u>faster</u> by high CO_2;	1	
			8) partial pressure of O_2 is low in respiring tissues;	1	
8	b		1) Decreased pH/increase in CO_2;	1	5 max
			2) detected by chemoreceptors;	1	
			3) in carotid/aortic bodies/medulla;	1	
			4) impulses sent to cardiac centre/medulla;	1	
			5) impulses sent along sympathetic/accelerator nerve/ noradrenaline released (to SAN/from Medulla);	1	
			6) heart pumps faster/greater stroke volume;	1	
			7) increase in blood pressure;	1	
			8) Caused by muscles squeezing veins;	1	
			9) detected by baroreceptors /pressure receptors;		Must be in context of CO_2

8	a/b		QWC	1	To be awarded once only but on 8a or 8b. QWC covers both questions