



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

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## GCE

## Biology B

## Unit BYB3

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**Question 1**

(a)	A = phloem/sieve tube; B = endodermis; C = xylem;	3
(b) (i)	A;	1
(ii)	C;	1
(c) (i)	higher /less negative to lower/more negative water potential; by osmosis;	2
(ii)	apoplast;	1
	Total	8

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**Question 2**

(a)	(more) carbon dioxide; decrease in pH/increased acidity/H ions; curve moves to the right/depressed; more oxygen released/H ions combine with Hb/Hb reduced;	3 max
(b) (i)	7-8 (%);	1
(ii)	(haemoglobin) releases more oxygen; in tissues/for respiration;	2
	Total	6

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**Question 3**

(a)	carotid; carbon dioxide/H ions; medulla; intercostal and diaphragm;	4
(b)	increases rate of breathing; increase with mixture P with more carbon dioxide compared to Q/R;	2
	Total	6

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**Question 4**

(a) (i)	<u>contraction</u> of the heart;	1
(ii)	elastic tissue/layer; stretching/recoil (of wall);	2
(b)	increase in total cross-sectional area/frictional resistance;	1
(c) (i)	reduced rate of flow allows more time for exchange;	1
(ii)	gaps/‘pores’; single layer of cells/endothelial layer; short diffusion pathway;	2
(d)	valves prevent backflow; residual blood pressure from heart; effect of (skeletal) muscle contraction negative pressure from thorax; ‘suction effect’ from heart;	2 max
	Total	9

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**Question 5**

(a)	‘suction effect’ from heart; behaves in same way as non-radioactive isotope; can be detected/measured; no radioactive isotope already present; long half-life;	2 max
(b)	same species/size/maturity/same concentration of isotope/same temperature/light/humidity/repeat experiment; (any two – one mark each)	2 max
(c)	prevent potassium/substances moving between xylem and phloem;	1
(d)	higher concentration of potassium in xylem of experimental plant; similar concentration when not separated;	2
	Total	7

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**SECTION B****Question 6**

(a) (i)	breakdown of ATP into ADP, Pi (and energy);	1
	(ii) ADP + creatine phosphate → ATP (+ creatine);	1
(b) (i)	glucose; fatty acids and glycerol;	2
	(ii) aerobic releases large amounts of energy whereas anaerobic releases small amounts; aerobic – carbon dioxide and water, anaerobic lactic acid;	2
	(iii) production of lactate/lactic acid/acid or H <sup>+</sup> ions from lactate production; muscle fatigue; alteration of enzymes/proteins;	3
(c) (i)	oxygen volume of inspired air; oxygen volume of expired air; or volume of air breathed/rate and depth of breathing; change in oxygen content;	2 max
	(ii) accounts for variation in body mass/size;	1
	(iii) lung capacity/volume/intercostal muscles developed; increase in cardiac output/heart muscle; improved circulatory supply e.g. capillary network; increase in muscle mass; increase in red blood cells/haemoglobin; more aerobic respiration compared to anaerobic; tissue respiration faster/more or larger mitochondria;	2 max
	Total	14

**Question 7**

- (a) (i) 75; 1
- (ii) valid method shown e.g.  $0.3 \div 0.8 \times 12$ ;  
4.5 hours; (*correct answer = two marks*) 2
- (b) (i) (cardiac) muscle is myogenic;  
sinoatrial node/SAN;  
wave of depolarisation/impulses/electrical activity (across atria);  
initiates contraction of atria  
atrioventricular node/AVN;  
bundle of His/purkyne tissue spreads impulse across ventricles;  
ventricles contract after atria/time delay enables ventricles to fill; 5 max
- (ii) pressure receptors;  
in aorta/carotid artery/sinus;  
send impulses (*award once only*);  
to medulla;  
send impulses (*award once only*);  
along parasympathetic / vagus pathway;  
slows heart rate; 5 max
- (iii) mixing of oxygenated and deoxygenated blood;  
blood flow from left to right ventricle  
higher blood pressure on left side; 2 max
- Total 15