



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

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

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

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

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

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⁺ 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; (<i>correct answer = two marks</i>)	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 (<i>award once only</i>); to medulla; send impulses (<i>award once only</i>); 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

Quality of Written Communication 1