

Respiration and Exercise 3 MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any two from: <ul style="list-style-type: none"> • constant speed • constant effort • constant temperature 	or allow converse for outdoors <ul style="list-style-type: none"> • variable speed • variable terrain • traffic conditions • variable temperature allow <ul style="list-style-type: none"> • wind (resistance) weather <ul style="list-style-type: none"> • rain / snow allow pollution only if qualified by effect on body function but ignore pollution unqualified if no other marks obtained allow variable conditions outdoors	2
b)	Brain		1
c)i)	20800	correct answer with or without working gains 2 marks if answer incorrect, allow 1 mark for use of 1200 and 22 000 only	2
c)ii)	oxygen glucose / sugar	apply list principle do not accept other named substances eg CO ₂ water allow glycogen ignore food / carbohydrate	1 1
c)iii)	respire aerobically		1
c)iv)	carbon dioxide lactic acid		1
d)	increased heart rate	ignore adrenaline / drugs accept heart beats more but not heart pumps more	1
Total marks			11

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	any three from: age (of athlete) gender (of athlete) starting concentration of	if diet given as answer = max 2 if none of these points gained amount of exercise = 1 mark	3

	glycogen type / intensity of exercise length of exercise period number of training sessions time interval between exercise sessions exercise at same time of day	if last four points not awarded allow time (for exercise) for 1 mark ignore references to amount of energy ignore they are both athletes	
a)ii)	any two from: intensity of exercise amount of exercise between sessions starting concentration of glycogen fitness / health metabolic rate / respiration rate amount / mass of muscle / physique aspects of diet qualified, eg amount of food eaten	do not accept amount of carbohydrate if no other marks awarded allow height / mass / weight for 1 mark	2
a)iii)	(B has) less glycogen or (B's glycogen) fell more or (B's glycogen) built up less	he = B accept use of approximate figures allow other correct observations from graph eg A is lower at end of first session ignore rate of fall	1
b)	athlete A (no mark) athlete A had more glycogen / B has less (only if A chosen to complete marathon) (glycogen / glucose) used in respiration (more) energy released / available in athlete A and either energy used for movement / muscle action / to run or (extra) glycogen → (more) glucose	to gain full marks 'more' must be given at least once accept converse argument for B ignore anaerobic allow 'energy made'	1 1 1 1
Total marks			10

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	LHS – glucose RHS – water	allow H ₂ O / H ₂ O	1 1
b)	so the earthworms' body temperature would change to 20 °C		1
c)i)	56 or 55 or 54	if incorrect answer given accept 60 - 5 for 1 mark or 60 - 6 for 1 mark or 60 - 4 for 1 mark	2
c)ii)	one-tenth of answer to (c)(i) eg 5.5		1
c)iii)	(at 10 °C / lower temperature): lower rate of respiration worms less active / worms release less energy / worms use less energy	allow chemical reactions slower or enzymes less active ignore breathing do not allow anaerobic	1 1
d)i)	anomalous result / not in line with other data / does not fit the pattern		1
d)ii)	more representative / more reliable / can check 'repeatability' / see if get similar values / identify anomalies	ignore valid / more fair ignore reproducible ignore 'to remove' anomalies do not accept more accurate or more precise	1
Total marks			10

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	anaerobic respiration	allow phonetic spelling	1
b)i)	4.4	4.2, 4.3, 4.5 or 4.6 with figures in tolerance (6.7 to 6.9 and 2.3 to 2.5) and correct working gains 2 marks 4.2, 4.3, 4.5 or 4.6 with no working shown or correct working	2

		with one reading out of tolerance gains 1 mark correct readings from graph in the ranges of 6.7 to 6.9 and 2.3 to 2.5 but no answer / wrong answer gains 1 mark	
b)ii)	more energy is needed / used / released (at 14 km per hour)	do not allow energy production ignore work	1
	not enough oxygen (can be taken in / can be supplied to muscles) so more anaerobic respiration (to supply the extra energy) or more glucose changed to lactic acid	allow reference to oxygen debt do not allow less / no oxygen allow not enough aerobic respiration	1 1
Total marks			6