

Question Number	Answer	Acceptable answers	Mark
1(a)	<p>A comparison including two of the following:</p> <p>both increase (1)</p> <p>oxygen uptake increases more when running / less when walking (from 6 to 10 km per hr) (1)</p> <p>from 6 to 8 km per hour running has a higher oxygen uptake (1)</p> <p>at 8 km per hour both running and walking have the same oxygen uptake (1)</p> <p>from 8 to 10 km walking has a higher oxygen uptake (1)</p>	<p>accept from 6 to 10 km per hour running increase by 13 ± 1 and walking increase by 22 ± 1</p> <p>accept quoted figures ± 1 eg at 6 running uses 2 ($\text{cm}^3/\text{kg}/\text{min}$) more than walking accept any speed between 6 and 7.9 (km per hr)</p> <p>ignore lines cross at 8</p> <p>accept quoted figures ± 1 eg at 9 running uses 6 ($\text{cm}^3/\text{kg}/\text{min}$) less than walking accept any speed between 8.1 and 10</p>	(3)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	(oxygen + glucose \rightarrow) water + carbon dioxide	<p>both water and carbon dioxide are required in either order.</p> <p>Accept $\text{H}_2\text{O} + \text{CO}_2$</p> <p>Ignore: energy</p> <p>reject wrong symbols eg H2O or H²O</p>	(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	<p>an explanation linking two of the following:</p> <p>muscles contract more / faster (1)</p> <p>more (aerobic) respiration (1)</p> <p>(so) more energy (is needed from aerobic respiration) (1)</p>	<p>'More' only has to be stated once for MP 2 and 3 more respiration for energy is carried out = 2 marks.</p> <p>Reject produce / make energy</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1(b)(iii)	B statement 2 only		(1)

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	<p>$24 \div 0.12$ (1)</p> <p>= 200 (beats per minute)</p>	two marks for correct bald answer	(2)

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	<p>more blood per minute / faster blood flow (1)</p> <p>more oxygen / glucose (transported to muscle cells) (1)</p>	'more' only has to be stated once blood flows faster carrying oxygen /glucose = 2 marks.	(2)

Total for Question 1 = 11 marks

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	<p>Any two of the following points:</p> <p>(yeast cell)</p> <ul style="list-style-type: none"> • has a nucleus (1) • does not have a flagellum (1) • does not have a plasmid (1) <p>(bacterial cell)</p> <ul style="list-style-type: none"> • has chromosomal DNA / circular DNA (1) • has a capsule (1) • has a slime coat (1) • does not have mitochondria (1) 	<p>Accept: has a vacuole</p> <p>accept: named bacterial feature e.g pilli, small ribosome, if not labelled in yeast cell</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	does not have chloroplasts/chlorophyll	cannot photosynthesise	(1)

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	7×10^9 (-) 5×10^{10} (1) $=$ (-) 4.3×10^{10} or (-) 43×10^9	<p>two marks for correct bald answer</p> <p>accept 43 000 000 000</p> <p>allow one mark for correct subtraction from wrongly selected numbers</p> <p>only accept the numbers in the table with a correct minus calculation</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	<p>A description including any two of the following points:</p> <ul style="list-style-type: none"> involved in defence against disease / part of immune system (1) phagocytosis (1) antibody / antitoxin production (1) 	<p>accept: (fight pathogen / harmful microorganism / named microorganism)</p> <p>accept: engulf / ingest / surround / digest cells</p> <p>reject: <u>make</u> antigens</p> <p>ignore: refs to role of red blood cells or platelets</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(b)(iii)	tired / lack of energy / lethargy / short of breath	<p>anaemia / fainting / less oxygen / increased anaerobic respiration</p> <p>reject: references to asthma</p>	(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	<ul style="list-style-type: none"> • (heart rate =) 198 to 200 (1) • (0.18 x 198 to 200 =) 35.6 to 36 (1) 	2 marks for correct bald answer ecf	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	B - 12.8 mmol dm ⁻³		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	D - the concentration of lactic acid is not dependent on heart rate		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(iv)	<p>Any three from the following:</p> <ul style="list-style-type: none"> • lactic acid increases / more lactic acid produced (as exercise increases) (1) • using more energy / muscles working / contracting harder / faster (1) • <u>aerobic</u> respiration at its maximum (rate) (1) • as oxygen not supplied fast enough / muscles not getting enough oxygen (1) • <u>anaerobic</u> respiration occurs (producing lactic acid) (1) 	<p>Accept stops Ignore breathing</p> <p>Accept body Accept not enough oxygen / oxygenated blood</p>	(3)

Question Number	Answer	Acceptable answers	Mark
3(b)	Any three from the following: <ul style="list-style-type: none"> • (concentration of lactic acid) decreases (1) • lactic acid broken down(1) • using oxygen / oxidised(1) • into carbon dioxide and water (1) • ref to oxygen debt / EPOC (1) 	Accept amount Accept if written in a word or formula equation for MP3 and MP4	(3)