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

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	(oxygen + glucose →) water + carbon dioxide	both water and carbon dioxide are required in either order. Accept H_2O + CO_2 Ignore: energy reject wrong symbols eg H2O or H^2O	**(1)**

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

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

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	24 ÷ 0.12 (1) = 200 (beats per minute)	two marks for correct bald answer	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	more blood per minute / faster blood flow (1) more oxygen / glucose (transported to muscle cells) (1)	'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)	Any **two** of the following points: (yeast cell) • has a nucleus (1) • does not have a flagellum (1) • does not have a plasmid (1) (bacterial cell) • has chromosomal DNA / circular DNA (1) • has a capsule (1) • has a slime coat (1) • does not have mitochondria (1)	Accept: has a vacuole accept: named bacterial feature e.g pilli, small ribosome, if not labelled in yeast cell	**(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}	two marks for correct bald answer accept 43 000 000 000 allow one mark for correct subtraction from wrongly selected numbers only accept the numbers in the table with a correct minus calculation	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	A description including any **two** of the following points: • involved in defence against disease / part of immune system (1) • phagocytosis (1) • antibody / antitoxin production (1)	accept: (fight pathogen / harmful microorganism / named microorganism) accept: engulf / ingest / surround /digest cells reject: make antigens ignore: refs to role of red blood cells or platelets	**(2)**

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

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	• (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)	Any three from the following: • 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)	Accept stops Ignore breathing Accept body Accept not enough oxygen /oxygenated blood	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(b)	Any three from the following: • (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)**