

<p>1 (ii)</p>	<p>lag phase: (dry) yeast adapting to the environment / AW; yeast are reproducing / dividing;</p> <p>log phase: no <u>limiting factors</u>; enough / plenty of, (named) nutrients;</p> <p>stationary phase: no more reproduction; <u>limiting factors</u>; none / reduction in, (named) nutrients; build-up of, toxic waste / alcohol; reference to carrying capacity;</p>	<p>max 3</p>	<p>e.g. glucose, sugar, ammonia, ammoni (compounds), minerals A low alcohol / toxin, concentration / correct pH</p> <p>A no growth of yeast (cells)</p> <p>A competition for nutrients A wrong pH</p>
<p>(e)</p>	<p>(named) alcohol production (for consumption); alcohol for fuel; bread making / making dough rise; yeast extract / probiotics / nutrient supplements; e.g. vegemite production of carbon dioxide; bioremediation;</p>	<p>max 2</p>	<p>A brewing / wine</p> <p>I baking unqualified</p>
		<p>[Total: 17]</p>	

	Answer	Marks	Guidance for Examiners														
2 (a)	<table border="1"> <tr> <td>structure</td> <td>letter from Fig. 1.1</td> </tr> <tr> <td>left lung</td> <td>D</td> </tr> <tr> <td>bronchus</td> <td>J</td> </tr> <tr> <td>diaphragm</td> <td>E</td> </tr> <tr> <td>intercostal muscle</td> <td>H</td> </tr> <tr> <td>rib</td> <td>C</td> </tr> <tr> <td>trachea</td> <td>B</td> </tr> </table>	structure	letter from Fig. 1.1	left lung	D	bronchus	J	diaphragm	E	intercostal muscle	H	rib	C	trachea	B	[5]	<p>Only one letter per box; if more than one letter no mark</p> <p>If letter crossed out but not rewritten mark it</p> <p>JEHCB</p>
structure	letter from Fig. 1.1																
left lung	D																
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(b) (i)	3750 ; <i>no mark for working alone</i>	[1]	<i>if the answer is not in the table look for it in the space for working</i>														
(ii)	number of breaths (per minute) / different rate of breathing ; exhaled breath has a higher temperature ;	[max 1]	A faster, slower, change in frequency ignore depth (as in the table) / heavier														
(iii)	water vapour / H ₂ O / any named rare or inert gas or pollutant ;	[1]	<i>names, correct symbols or formulae for any of the following: H₂, Ar, He, Xe, Ne, Rn, Kr, SO₂, O₃, CO, NO₂, N₂O, CH₄, NH₃, I₂</i>														
(iv)	<p><i>in breathed out air</i></p> <p>1 after exercise less oxygen <u>and</u> more carbon dioxide / ora ;</p> <p>2 use of data <u>with %</u> to quantify (for either oxygen or carbon dioxide) ; <i>explanation in terms of the following increasing</i></p> <p>3 more oxygen, absorbed / is needed / used up ;</p> <p>4 more carbon dioxide, produced ;</p> <p>5 more gas exchange ;</p> <p>6 more <u>respiration</u> ; R more anaerobic respiration</p> <p>7 more energy required ;</p> <p>8 repaying / AW, oxygen debt ;</p>	[max 3]	<p>MP2</p> <p>oxygen – 17.2 to 15.3% / 1.9%</p> <p>carbon dioxide – 3.6 to 5.5% / 1.9%</p> <p>R inhaled</p> <p>R exhaled</p> <p>R produce energy</p>														

Question		E	Answers	Marks	Additional Guidance											
3	(a)		<table border="1"> <thead> <tr> <th rowspan="2">cell</th> <th colspan="2">end products of respiration</th> </tr> <tr> <th>aerobic</th> <th>an</th> </tr> </thead> <tbody> <tr> <td>yeast</td> <td>carbon dioxide/CO₂ + water/H₂O ;</td> <td>carbon dioxide/CO₂ + alcohol/ethanol/C₂H₅OH ;</td> </tr> <tr> <td>human muscle cell</td> <td>carbon dioxide/CO₂ + water/H₂O ;</td> <td>lactic acid lactate/ C₃H₆O₃/CH₃CH(OH)COOH / CH₃CH(OH)COO ;</td> </tr> </tbody> </table>	cell	end products of respiration		aerobic	an	yeast	carbon dioxide/CO ₂ + water/H ₂ O ;	carbon dioxide/CO ₂ + alcohol/ethanol/C ₂ H ₅ OH ;	human muscle cell	carbon dioxide/CO ₂ + water/H ₂ O ;	lactic acid lactate/ C ₃ H ₆ O ₃ /CH ₃ CH(OH)COOH / CH ₃ CH(OH)COO ;	[4]	<i>ignore</i> ATP/energy
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	(b)	1	muscles <u>contract</u> ;		<i>ignore</i> 'breathing rate', 'ventilation rate', 'oxygen absorption', 'heart rate', 'blood pressure' (all are in the Table) R repaying oxygen debt (occurs after exercise)											
		2	need more energy ;													
		3	increase in need for oxygen ; ORA													
		4	removal of (more) carbon dioxide ;													
		5	(increase in) <u>aerobic</u> respiration ;													
		6	<u>anaerobic</u> respiration also occurs ;													
		7	developing <u>oxygen debt</u> ,/oxygen not supplied fast enough ;													
		8	(production of) lactate/lactic acid ;													
		9	increase in stroke volume (of heart) ;													
		10	increase in, blood flow/glucose/oxygen, to muscles ;													
		11	blood pressure increase because heart rate/stroke volume increases ;													
		12	removal of heat ;													
		13	ref to adrenaline ;													
				[max 5]												
				[Total: 9]												

4	(a)	$C_6H_{12}O_6$ $2 C_3H_6O_3$	[2]	ignore word equation ignore energy / ATP R if 2 is not included for $C_3H_6O_3$ R O_2 , CO_2 , H_2O on either side
	(b)	biceps contracts triceps relaxes	[2]	accept ref to <u>antagonistic</u> pair of muscles
	(c)	<p><i>During:</i></p> <ol style="list-style-type: none"> oxygen consumption increases as exercise starts levels off / increase slows down during the race data quote for consumption during the race <p><i>After:</i></p> <ol style="list-style-type: none"> starts to decrease, immediately at the end of the race / at 18 minutes gradually decreases after exercise rate returns to original / resting level data quote for consumption after exercise 	[max 4]	<p>Units must be stated at least once</p> <p>e.g. of Mpt 3: A plateaus between $2.1 - 2.4 \text{ dm}^3 \text{ min}^{-1}$ Maximum is $2.4 \text{ dm}^3 \text{ min}^{-1}$ 3 – 4 mins /at start / 5 to 8 or 9 mins to reach maximum</p> <p>e.g. of Mpt 7: A Resting rate at $0.25 \text{ dm}^3 \text{ min}^{-1}$, 9 – 10 mins / at 18 to 27 or 28 min to reach original level</p>
	(d)	<ol style="list-style-type: none"> <u>oxygen debt</u> not enough oxygen supplied (to muscles) during exercise to muscles anaerobic respiration lactic acid produced lactic acid, broken down / respired / converted to glucose / CO_2 and water / oxidized requires (extra) oxygen oxygen restored to haemoglobin AVP. e.g. restored to myoglobin (in muscles) 	[max 5]	<p>A lactate for lactic acid throughout the answer</p> <p>Mpt 6 R removed</p> <p>lg lowers pH, muscles stiff / cramps</p>
			[Total: 13]	