

Respiration

Mark Scheme 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Respiration
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme 1

Time Allowed: 48 minutes

Score: /40

Percentage: /100

Question	Answer	Mark	Comments
1 (a) (i)	axes labelled with units, appropriate scale on both axes ; size to fill half or more space in both dimensions ; plotted points +/- one small square accuracy with appropriate correct symbols ; neat, accurate, ruled or smooth line passing through the plotted points ; key to identify A and B plots and curves ;	[5]	A reversed orientation of axes
(ii)	<i>description</i> 1 number of bubbles in a minute increases with time ; 2 A released bubbles, more / faster (than B) / ora ; 3 (colour change) from red to, yellow / yellow pink with time ; 4 A changed colour faster (than B) / ora ; 5 A formed foam, more / faster (than B) / ora ; 6 suitable <u>comparative</u> data quote at a stated time ; <i>explanation</i> 7 releasing gas by <u>respiration</u> ; 8 gas released carbon dioxide ; 9 carbon dioxide is acidic ; 10 causes hydrogencarbonate indicator solution to change from red to yellow ; 11 A is respiring aerobically / B is respiring anaerobically ; 12 (the rate of) gas released in anaerobic respiration is slower / ora ;	[max 5]	max 3 for each of description and explanation
(iii)	use up, glucose / substrate ; production of ethanol toxic ; (water bath) cools down ; enzyme activity / respiration rate slows ;	[max 1]	
(b) (i)	to mix / spread (evenly) ; yeast cells sediment to bottom / AW ; to prepare a uniform sample ;	[max 1]	
(ii)	to exclude the oxygen / gas / air ;	[1]	

(iii)	(warm) temperature speeds up (enzyme/yeast) activity/respiration (rate)/metabolism/fermentation/AW ; temperature, is controlled / kept equal ;	[max 1]	
(c) (i)	presence/absence, of oxygen/oil ;	[1]	A oxygen/air/gas
(ii)	concentration/volume/mass, of yeast culture in A and B ; concentration/volume/mass, of glucose in yeast culture ; time for yeast culture to stand before use ; (water bath) temperature ; AVP ; e.g. species of yeast, volume/concentration, of indicator	[max 2]	R oxygen/oil/rate of respiration
(d)	bubble production/colour change/foam production ; divided by time ;	[max 2]	
(e) (i)	<u>asexual</u> reproduction/mitosis/budding/AW ;	[1]	
(ii)	100 (mm) ; formula : length measured ÷ magnification ; 0.02 ;	[3]	A 99 – 101 (mm) A 0.0198 – 0.0202
		[Total: 23]	

	Answer	Marks	Guidance for Examiners																											
2 (a)	<p>table drawn with (ruled) lines and cells;</p> <p>headings correct (time, volume and (syringe) 1, 2, 3);</p> <p>units correct in both headings;</p> <p>results recorded in table;;; (1 mark per column completed)</p>	6	<p>A any orientation, outer border not needed</p> <p>R units within the table</p> <table border="1"> <thead> <tr> <th rowspan="2">time / min</th> <th colspan="3">volume / cm³</th> </tr> <tr> <th>(syringe) 1</th> <th>(syringe) 2</th> <th>(syringe) 3</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> </tr> <tr> <td>15</td> <td></td> <td></td> <td></td> </tr> <tr> <td>20</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	time / min	volume / cm ³			(syringe) 1	(syringe) 2	(syringe) 3	0				5				10				15				20			
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(b) (i)	to make the results more reliable/to find anomalies/to calculate an average;	1																												
(ii)	syringe 2 (reading at 15 min/20 min) much lower than others / syringes 1 and 3 are similar;	1																												
(iii)	16;	1	(18 + 12 + 19 = 49 , 49 / 3 = 16.33 = 16)																											
(c) (i)	30;	1	(35 – 5 = 30)																											

<p>(ii)</p>	<p>A – axes labelled and scaled evenly;</p> <p>S – size,</p> <p>P – all points plotted accurately $\pm\frac{1}{2}$ small square;</p> <table border="1" data-bbox="275 483 1148 607"> <tr> <td>10</td> <td>20</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>5</td> <td>15</td> <td></td> <td></td> <td></td> <td>2</td> </tr> </table> <p>L – line drawn;</p>	10	20						1	5	15				2	<p>4</p>	<p>x-axis: temperature / ° y-axis: average increase in volume / cm³ I orientation plots to fill half, or more than half, of grid along both axes</p> <p>P = 0 if no scale A ecf (d)(i) A ecf of correct plots on an uneven scale</p> <p>if plot average volume and not average increase in volume = max 3</p> <p>A either best fit or point to point, ruled lines or smooth curve R extrapolation > $\frac{1}{2}$ small square R histogram or bar chart</p>
10	20																
1	5	15				2											
<p>(iii)</p>	<p>as the temperature increases the (average) increase in volume increases to a peak / up to 50 °C;</p> <p>up to 50 °C the (average) increase in volume starts slowly, then increases;</p> <p>above 50 °C the (average increase in) volume slows / increases less / decreases;</p>	<p>max 2</p>	<p>A trend– as temperature increases, volume increases then decreases = max 1</p> <p>A non-linear / changes gradient</p> <p>R volume decreases A ecf for wrong optimum temperature</p>														

(iv)	yeast activity increases with temperature up to 50 °C; optimum temperature is 50 °C; (some of) yeast is killed /enzymes become denatured above 50 °C;	max 1	A enzyme activity /metabolism /respiration I volume /growth of yeast R yeast is denatured /enzyme is killed
		[Total: 17]	