OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



MARK SCHEME

B4.1 WHAT HAPPENS DURING CELLULAR RESPIRATION? (FOUNDATION)

SCORE	PERCENTAGE
/31	%

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Question			Answer/Indicative content	Marks	Guidance
1	a		Makes ATP ✓	1	If more than one box is ticked, do not award the mark even if the correct box is also ticked
	b	i	1. Plots correct +/– half a square ✓ 2. Appropriate scale ✓ 3. Axes correct and labelled ✓	3	MP3 **DO NOT ALLOW** axis labels without units
		ii	Line should be smooth and through all plots ✓	1	**IGNORE** extensions to the line beyond the plots
		iii	6 ✓	1	**ALLOW** +/– 1 **ALLOW** an answer +/–1 correctly read from an incorrect plot
		iv	Do more intermediate temperatures ✓	1	**DO NOT ALLOW** do more temperatures
			Total	**7**	
2			enzymes (1) anaerobic (1) energy (1) glucose (1)	4	**Examiner's Comments** Here, candidates were required to select words to complete sentences about respiration in yeast. The question was at least partly accessible to most and the full range of marks was seen.
			Total	**4**	
3	a		lack of / no oxygen (1)	1	**Examiner's Comments** Better candidates knew that anaerobic respiration takes place in the absence of oxygen.
	b		18 (1)	1	**Examiner's Comments** Most could select the number of molecules of glucose needed to produce 36 molecules of ATP.
			Total	**2**	

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Question			Answer/Indicative content	Marks	Guidance
4	a		carbon dioxide (1) ethanol (1)	2 3	accept any indication of correct response e.g underline delete one mark for each additional incorrect response Examiner's Comments This question was aiming to get candidates to describe the results in the table and was worth 3 marks. Centres would be advised to practise this type of question with their candidates as many explained the results rather than describing them.
	b	i	*any three from*B increases faster than A (1)numbers double in B every hour (1)A doubles in first hour, but the		Examiner's Comments Many candidates failed to read the rubric properly on this question and many had circled glucose and starch.
		ii	*any three from:* fermenter A uses up the oxygen / there is no oxygen (1) (therefore) they respire anaerobically after an hour (1) energy is needed for cell division / growth / reproduction (1) less energy released from anaerobic respiration ORA (1) so the rate of population growth slows (1)	3	OWTTE Examiner's Comments This was a particularly challenging question and many failed to score.
			Total	8	

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Question			Answer/Indicative content	Marks	Guidance
5	a		A= aerobic **AND** B= anaerobic;	1	**Examiner's Comments** Correctly answered by many who could correctly spell both aerobic and anaerobic. The substantial minority who did not score the mark seemed not to be aware of the terms at all rather than simply making spelling errors.
	b		2880 / 150; 19.2 / 19 / 19.2:1 / 19:1 / 96:5;	2	**Accept** 1440 / 75 or 960/50 or 288 / 15 or 96/5 or 480 / 25 **for first MP** Correct answer = 2 marks **Ignore** units **Examiner's Comments** This part was well answered by many candidates. A number of others were able to score 1 mark by showing some working.
	c		To prevent / reduce production of lactic acid; Type A provides a lot of energy / type B provides little energy;	2	**accept** avoid pain / cramp **Examiner's Comments** The question required candidates to realise that lactic acid would be produced by anaerobic respiration, and a number scored this marking point by linking this to pain or cramp. Candidates also needed to realise that Type A (aerobic) respiration provides a lot more energy than anaerobic respiration.

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Question			Answer/Indicative content	Marks	Guidance
	d	i	A no correlation or description; B positive correlation or description; C negative correlation or description; D positive correlation or description;	4	e.g. In A / 1st section / 0 – 30 mins, one goes up and one stays the same e.g. In B / 2nd section / 30 – 60 mins, both go up e.g. In C / 3rd section / 60 – 75 mins, one goes up, the other goes down e.g. In D / 4th section / 75 – end, both go down **Examiner's Comments** This was a challenging question which required candidates to understand the difference between positive and negative correlation. Some responses were limited by giving only a trend e.g. in section A the heart rate goes up. The best responses were ones where the consideration of the graph was organised into the four sections on the graph.
		ii	Repeat the same training a number of times. ✓ Repeat her training but only run for 60 minutes. Run more slowly so that her heart rate does not rise too much. Repeat the same experiment on other runners.	1	**Examiner's Comments** Part dii was very well answered by the majority of candidates.
			Total	**10**	

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