

WJEC (Eduqas) Biology GCSE
Topic 1.3 Cell Metabolism
Questions by Topic - Mark
Scheme

1.	Question	Marking details	Marks Available
	1 (a) (i)	Protein; Chemical;	2
	(b) (i) I	linear scale; must include number at origin and encompass all readings	1
	II	plots;; +/- ½ small square -1 if line taken back to origin	2
	III	line;	1
	(ii) I	Increase then decrease; Optimum pH7.5 (from data/ graph) ;	2
	II	Correct readings from their graph = 1 mark	2
	(iii)	Temperature affects enzyme activity; Accept reference to varying more than one variable not being a fair test	1

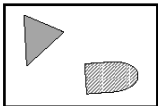
2.	Question			Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			digestion (1) } respiration (1) } (either order) photosynthesis (1)	1 1 1			1 1 1		
	(b)	(i)		X		1		1		
		(ii)		6.0 – 7.5		1		1		
		(iii)		Mouth/ salivary glands Reject saliva gland/ cheek	1			1		
				Question 2 total	4	2	0	6	0	0

3.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)				1	Any one from: <ul style="list-style-type: none"> (small enough) to be absorbed/ to make food soluble/ to pass {into the blood/ through the intestine wall}; 	ORA	To make them smaller	
(b)	i			1	the rate (of digestion) increases when {pH/ alkalinity} increases; it = rate of digestion	ORA At high pH it is faster		

4.			Question	Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(a)			amino acids (1) lipids (1) Ignore: Fats fatty acids and glycerol (either order) (1)	3			3		
	(b)			A = 3 B = 2 C = 4 D = 1 all four correct (1)		1		1		
	(c)	(i)		(as temperature increases) {the rate/it} {rises/ increases} (1) to optimum/until 35 °C (1) NOT 6a.u. then falls (1)		3		3		
		(ii)		(shape of the) <u>active site</u> {destroyed/ changed/ deformed/ damaged} (1) <u>substrate</u> cannot {bind/ fit/ join/ attach/ connect} (1)	2			2		
				Question total	5	4	0	9	0	0

5.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	i			2	both substrate molecules having entered the enzyme; an attempt to make them connect;			
	ii			1	Lock and Key;		Enzyme substrate complex	
	iii			2	(Boiling) alters the shape of the {enzyme/active site}/ denatures enzyme; so the molecules do not <u>fit</u> into enzyme/ active site;			

6.

	Question	Marking details	Marks Available
Q.6	(a)	(i) Enzyme works in {acid pH/ lower pH/ 4.5}/ (ORA); NOT low pH	1
		(ii) Enzyme denatured or destroyed;	1
	(b)	As below, ignore chemical bond if drawn;	
			1
	(c)	Lock and key;	1

7.	Question	Marking details	Marks Available
7	Indicative content	<p>Similarities: both break down glucose and <u>release</u> energy.</p> <p>Differences: muscle cells produce lactic acid and no carbon dioxide during anaerobic respiration. Aerobic respiration produces water and carbon dioxide. Aerobic uses oxygen and anaerobic does not. Anaerobic creates oxygen debt, aerobic does not.</p> <p>Aerobic is more efficient because it releases more energy per glucose molecule than anaerobic because it completely breaks down glucose.</p> <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit</p>	
Question 7 Total			[6]

8.	Question	Marking details	Marks Available
	Q.8 (a)	Oxygen and carbon dioxide;	1

9.	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
	<p>Indicative content:</p> <ul style="list-style-type: none"> Equation 1 shows aerobic respiration. Equation 2 shows anaerobic respiration. <p>Aerobic respiration</p> <ul style="list-style-type: none"> occurs all the time / when oxygen is available releasing most energy from glucose molecules/ producing <u>more</u> molecules of ATP glucose completely broken down This is an advantage of aerobic respiration . <p>Anaerobic respiration</p> <ul style="list-style-type: none"> occurs when blood/body cannot supply sufficient oxygen (to muscles)/ does not require oxygen releasing less energy / <u>fewer</u> molecules of ATP are produced glucose molecules incompletely broken down This is a disadvantage of anaerobic respiration (Another disadvantage is it also) produces lactic acid/ oxygen debt/ muscle fatigue . <p>5-6 marks Detailed description of the entire process <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p> <p>3-4 marks General outline of aerobic and anaerobic respiration <i>There is a line of reasoning, which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p> <p>1-2 marks brief outline of aerobic and anaerobic respiration <i>There is a basic line of reasoning, which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p>0 marks: No attempt made or no response worthy of credit.</p>	6	0	0	6		
	Question total	6	0	0	6	0	0

10.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)	(i)	Both for 1 mark Tomos 9.5 dm ³ and Jeremy 16 dm ³	1			1	1	
		(ii)	To obtain more oxygen into the {bloodstream/ muscles} / get rid of lactic acid/ repay oxygen debt		1		1		
	(b)	(i)	{Almost all/ Most} energy released comes from anaerobic respiration			1	1		
	(c)	(i)	Glucose + oxygen → carbon dioxide + water + {energy/ATP} Accept correct formulae	1					
		(ii)	Glucose → lactic acid + {energy/ ATP} Accept correct formulae	1					
	(d)		Releases more {energy/ ATP} per glucose molecule than anaerobic/ completely breaks down glucose/ all the glucose is broken down	1			1		
			Question total	4	3	1	8	3	0

11.

Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
(a)	(i)	4.9 = 1 mark 20.9-16.0 =		1		1	1	
	(ii)	(aerobic) respiration Reject anaerobic	1			1		

12.

Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
(a)		Glucose \longrightarrow Lactic Acid + ATP	1			1		
(b)		Not all the glucose is broken down/not completely broken down (1) Less ATP is produced (1) ORA for aerobic respiration	2			2		
(c)	(i)	Correct reference to oxygen debt (1) Oxygen required to {break down/ remove} lactic acid (1)		2		2		

13.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a) i	1	6;			
ii	1	Anaerobic;			
iii	2	At zero min/ between 0-2/ at beginning/ before exercise starts; <u>most</u> aerobic respiration is occurring; 2 nd mark linked to 1 st	Least/ lowest lactic acid produced	Oxygen debt	
(b)	1	Muscle;			
Total Mark	5				

14.

Question Marking details

Marks
Available

(c) (i) Fermentation/ fermenting;

1

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
15. (a)	2	Anjum produces less lactic acid/ concentration of lactic acid is lower; It is broken down quicker / removed quicker / repays oxygen debt quicker/ needs a shorter time to recover;			
(b)	1	The marathon runner does not need to release energy {quickly / in a short time} (like a sprinter);			
Total Mark	3				

16.

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
(b) (i)	more {energy/ATP} is needed (for exercise) (1) from <u>aerobic</u> respiration (1)		2		2		
(ii)	(more {energy/ATP} is now being released by) <u>anaerobic</u> respiration (1) Lactic acid production (causing cramp) (1)		2		2		
(c)	more accurate measurement of aerobic respiration/ref. validity of conclusions/increased confidence			1	1		
	Question 16 total	0	7	3	10	3	4

17.	Question	Marking details	Marks Available
17 (a)	(i)	<p>2/3 correct lines;; (1 correct = 1 mark)</p>	2
	(ii)	For absorption/ pass through cell/ for getting into blood/ for use by cells/ pass through cell membrane;	1
	(iii)	{for /to release / to get} source of energy; NOT produce energy/ make energy	1

18.	Question	Marking details	Marks Available
18 (a)		<u>Enzyme –substrate complex</u> ;	1
	(b)	<u>Active site</u> is {changed/distorted/altered}/bonds in active site are broken; {Substrate/amino acid} cannot {fit/join/lock }; NOT match	2
	(c)	Temperature; pH; NOT PH/Ph Concentration of substrate; Concentration of enzyme; Reject amount/volume/mass	Max 2
		Question 18total	[5]