AQA GCSE Biology

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
1.1	$C_6H_{12}O_6$ $6H_2O$	Answers must be given in the correct order	1 1	AO1 4.4.2.1
1.2	Any **three** from: More energy is transferred to the environment when new bonds are made (in products) than is taken in to break bonds (in reactants) This makes the environment slightly warmer		3	AO1 4.4.2.1
1.3	Muscle cells are more active / require more energy More mitochondria means more energy is released Energy is needed for the muscle cells to contract	Allow converse arguments for first 2 marking points if answer written about fat cells	1 1 1	AO2 4.1.1.2 4.4.2.1
1.4	During active transport / movement of mineral ions against their concentration gradient into the root Chemical reactions to build amino acids / larger molecules	Accept any other appropriate use of energy	1 1	AO1 4.1.3.3 4.4.2.1
2.1	To absorb carbon dioxide		1	AO2 4.4.2.1

2.2	Any **six** from: Write down the start position of the air bubble Leave earthworms to respire for a set period of time As they take in oxygen the bubble will move Carbon dioxide will be removed by the soda lime so volume of gas in test tube will decrease At end of time period write down the position of the bubble Calculate the distance moved by the bubble in a set time Repeat the experiment at this temperature Place in a water bath of a different temperature and allow time to accumulate Repeat whole experiment at four (or more) different temperatures Experiment can be reset between repeats by opening the tap and letting gas back into the test tube.	Accept alternative measurement suggested – measure the time taken for a bubble to move a certain distance	6	AO2 4.4.2.1
2.3	Return the earthworms to their natural environment as soon as possible / do not subject worms to very high temperatures / handle worms carefully	Accept any other appropriate suggestion related to the earth worms welfare	1	AO3 4.4.2.1
2.4	Rate of respiration = gradient of line Rate of respiration at 20°C = 5.5 mm/min, and at 10°C = 2.5 mm/min Rate at 20°C is 2.2 x higher	Allow 1 mark for 6 mm/min or 3 mm/min Allow 1 mark for difference = 3 mm/min	1 2 2	AO2 4.4.2.1 Ms 4a, 4d
2.5	Line of gradient > line for 20°C Respiration is an enzyme controlled reaction The higher the temperature the more substrate-enzyme collusions so the reaction occurs faster		1 1 1	AO3 x1 AO2 x2
3.1	Glucose → Ethanol and carbon dioxide		1 1	AO1 4.4.2.1
3.2	Yellow		1	AO2 4.4.2.1

3.3	To prevent oxygen contacting the yeast / to ensure the yeast respires anaerobically		1	AO2 4.4.2.1
3.4	Place the equipment in water baths of (at least five) different temperatures Allow time for the yeast to acclimatise Allow yeast to respire for fixed period of time Determine the rate of respiration using the indicator colour scale		1 1 1 1	AO2 4.4.2.1
3.5	Attach a gas syringe to the open tube Measure the volume of gas given off in a set period of time	Accept use inverted liquid-filled test tube Accept for 2 marks measure the time it takes for a certain volume of gas to be given off	1 1 1	AO3 4.4.2.1
4.1	220 mg/dm^3		1	AO2 4.4.2.2 Ms 4a
4.2	Two from: Exercise was vigorous so cells respired anaerobically Oxygen not supplied to cells fast enough Glucose is not completely broken / incomplete oxidation of glucose (causing lactic acid to be produced)		1 1	AO2 4.4.2.2
4.3	Rate = $\frac{(900-220)}{10}$ Rate = 68 mg/dm^3 per minute		1 1	AO2 4.4.2.2 Ms 1c

4.4	Any six from: Concentration of lactic acid in the bloodstream decreases Lactic acid is being broken down The blood transports the lactic acid into the liver Lactic acid is first converted back to glucose (Then the glucose is converted) into carbon dioxide and oxygen by aerobic respiration This requires extra oxygen The amount of oxygen required is known as known as the oxygen debt		6	AO1 4.4.2.2
5.1	To transfer energy to the cells/ provide cells with energy To use in chemical reactions (needed to maintain life)		1 1	AO1 4.4.2.1
5.2	No Yes No Ethanol		1 1 1 1	AO1 4.4.2.1
5.3	Anaerobic respiration in yeast produced ethanol Used in alcohol production / named alcoholic product Anaerobic respiration in yeast produces carbon dioxide Used to make bread rise		1 1 1 1	AO1 4.4.2.1
6.1	D		1	AO2 4.4.2.1
6.2	Carbon dioxide and water		1	AO1 4.4.2.1
6.3	Any two from: More energy is released No lactic acid is made Build-up of lactic acid can cause muscle fatigue		2	AO1 4.4.2.1

7.1	Any four from: Glucose concentration has decreased Glucose is broken down in respiration / is a reactant of respiration (aerobic and anaerobic) Lactic acid concentration has increased / has been produced Lactic acid is produced from the incomplete break down of glucose So anaerobic respiration took place		4	AO2 4.4.2.1 4.4.2.2
7.2	800% increase	Accept $\frac{(18-2)}{2}$ for 1 mark	2	AO2 4.4.2.1 4.4.2.2 MS 1c
7.3	Any **six** from: Heart rate increased: To speed up the rate at which blood is moved around the body So more oxygen is transferred to cells / carbon dioxide removed Maintains a high concentration gradient for the diffusion of gases between blood and cells / blood and lungs to provide additional oxygen for respiration Breathing rate increased: More oxygen diffuses into blood / carbon dioxide diffuses into the lungs to bind to red blood cells to provide additional oxygen for respiration		6	AO1 4.4.2.2
8.1	Sum of all the reactions which take place inside a cell / organism		1	AO1 4.4.2.3

8.2	Respiration releases the energy needed for reactions to occur Respiration required to maintain body temperature so enzyme-controlled reactions occur efficiently		1 1 1	AO1 4.4.2.3
8.3	Fatty acids Glycerol		1 1	AO1 4.4.2.3
8.4	Any **two** from: Both storage molecules Converted back into glucose when energy is needed		2	AO1 4.4.2.3
9.1	Any **four** from: Sprinters require lots of energy very rapidly They will respire anaerobically But there will not be time for lactic acid to build up and cause muscle fatigue (before race completed) Marathon runners need their muscles to work effectively over a much longer duration If rate of oxygen usage > rate of oxygen uptake, lactic acid will be produced If lactic acid builds up, muscles will no longer contract		4	AO2 4.4.2.2
9.2	Less oxygen is available at high altitudes (which stimulates red blood cell production) When athlete performs at lower altitudes their bodies are able to carry more oxygen Therefore, rate of respiration increases So the activity / rate of energy release can be maintained for a longer period (without respiring anaerobically)		1 1 1 1	AO2 4.4.2.2
9.3	Additional blood in athlete's body means additional red blood cells Oxygen-carrying capacity of blood increased so athlete respires aerobically for longer		1 1 1	AO2 4.2.2.3 4.4.2.2

10.1	$6O_2$ $6H_2O$		1	AO1 4.4.2.1
10.2	Anaerobic respiration is not as efficient as aerobic respiration Less energy is released per glucose molecule Glucose is not broken down completely Lactic acid is produced which causes muscle fatigue		1 1 1 1	AO1 4.4.2.1
10.3	Any **four** from: • Lactic acid produced during anaerobic respiration has to be converted back into glucose • This requires oxygen • the volume of oxygen needed for this process is the oxygen debt • heart rate and breathing rate stay high to supply extra oxygen to (muscle) cells until all lactic acid is removed and oxygen debt is paid	Ignore references to heat loss	4	AO2 4.4.2.1 4.4.2.2
11.1	Break down / softens cell walls /cell membranes To remove the chlorophyll as chlorophyll / the green colour can mask the observed colour change		1 1 1	AO2 4.4.1.1
11.2	Boil ethanol by placing in a beaker of boiling water So ethanol is not close to a naked flame / ethanol is highly flammable	Wash hands after using iodine Iodine is an irritant	1 1	AO2 4.4.1.1

11.3	Any **four** from: Green areas turn blue / black so starch is present in these areas Produced through process of photosynthesis White areas remain yellow / orange / iodine does not change colour As no starch is present Green parts contain chlorophyll / white parts do not contain chlorophyll		4	AO2 4.4.1.1
11.4	Any **six** from: • Carbon dioxide diffuses into plant from the air • through the stomata • Water absorbed / diffused / moves by osmosis • from soil into root cells • Light absorbed by chlorophyll / chloroplasts • Water and carbon dioxide are chemically joined / react during photosynthesis • to produce glucose • Glucose molecules join together to make starch using energy from respiration		6	AO1 4.2.3.2 4.4.1.1 4.4.1.3
12.1	A – Trachea B – bronchus C – Lung D – Alveolus E – Diaphragm	Accept bronchi Accept alveoli	5	AO2 4.2.2.2
12.2	Large surface area – Increases area over which diffusion can occur Thin membrane – short diffusion distance Rich blood supply – maintains a steep concentration gradient		3	AO3 4.1.3.1

12.3	Exhaling because the lung volume measurements are decreasing	1 mark for reason	1 1	AO2 4.2.2.2
12.4	Rate of change of volume = volume / time Person 1: 0.66 Person 2: 0.41 Unit: dm^3/s Person 1 had a rate of change of lung volume 1.6x that of Person 2	Award unit mark for either value	1 1 1 1 1	A02 4.2.2.2 Ms 2b, 2f
12.5	(Person 2) as less air breathed out / reduced flow rate / more air left in lungs after exhalation as alveoli have less volume / can contain less air	Ignore references to maximum lung capacity	2	AO3 4.2.2.2
13.1	For example: Circulatory system – transports materials around the body in the body Nervous system – transmits impulse around the body Reproductive system – produces offspring	Award one more organ system and 1 mark for linked description Accept any other correct system not listed	2	AO1 4.2.1
13.2	H		1	AO2 4.2.2.1
13.3	Absorb water (from undigested food)		1	AO2 4.2.2.1
13.4	Any **two** from: Provides optimum conditions for (protease) enzymes to work Speeds up protein digestion Kills microorganisms Prevents illness/ stopping disease		1 1	AO2 4.2.2.1
14.1	Composed of many cells working together to perform a function		1	AO1 4.2.1 4.2.2.3

14.2	Any **two** from: Hormones / carbon dioxide / urea / glucose / dissolved proteins		2	AO1 4.2.2.3
14.3	Any **six** from: • Some white blood cells ingest pathogens • By phagocytosis • where pathogen is digested and destroyed • Some white blood cells produce antibodies • specific to antigen on pathogen • Antibodies can be produced quickly if pathogen met again • causing immunity • Some white blood cells produce antitoxins counteract / neutralise toxins released by microorganisms		6	AO1 4.2.2.3 4.3.1.6