AQA Style

GCSE

COMBINED SCIENCE

H

Higher Tier Biology Paper 1

Mark Scheme

BEYOND SCIENCE

Question 1

Question	Answers	Extra information	Mark
01.1	lipase		1
01.2	simple sugars/glucose		1
01.3	salivary glands pancreas	Answers in either order.	1 1
01.4	add Biuret reagent turns lilac/purple	Allow add sodium hydroxide **and** copper sulfate.	1 1
01.5	liver		1
01.6	bile emulsifies fat/forms small fat droplets which increases the surface area for digestion **or** bile is alkaline so it neutralises stomach acid (to create optimum pH for enzymes)	Allow **1** mark for a correct function of bile. For **2** marks, students must give both the function of bile **and** an explanation of how it increases the rate of fat digestion.	2
Total			**9**

Question 2

Question	Answers	Extra information	Mark
02.1	to remove excess solution/liquid/water from the carrot sticks		1
02.2	Any **two** from: • cut carrots into sticks of equal size/length • use a wider range of concentrations of sugar solution • use smaller intervals of concentration of sugar solution • control volume of sugar solution • leave the carrots in the sugar solutions for a longer time • repeat the investigation		2
02.3	$\frac{0.8}{16.0} \times 100$ = (+) 5 (%)	An answer of (+) 5 (%) with no working scores **2** marks. Allow **1** mark for evidence of $\frac{0.8}{16.0}$.	1 1
02.4	the carrot sticks have different masses at the start percentage change allows results to be compared		1 1
02.5	all points plotted correctly straight line of best fit ignoring the point at (5.0, -20)	Allow ± ½ a small square. Allow error carried forward from **02.3**. Allow **1** mark for 4 or 5 points plotted correctly. Allow correct line of best fit for incorrectly plotted points.	2 1
02.6	water is lost (from the carrot sticks) by osmosis from the dilute solution inside the carrot to the concentrated solution in the test tube	 Allow high water concentration inside the carrot to low water concentration in the test tube.	1 1 1
Total			**13**

Question 3

Question	Answers	Mark
03	**Level 3:** There is a clear and detailed method which would produce valid results. The method must include at least one control variable **and** a description of what is being measured.	5-6
	Level 2: Most of the method is described with only some missing detail. The method must include at least one control variable or a description of what is being measured.	3-4
	Level 1: There are simple statements that give a brief description of parts of the method.	1-2
	No relevant content.	0
	Indicative content: • Description of how the apparatus would be used. • Reference to the control of temperature using a water bath or electric heater. • Use of a measuring cylinder or syringe to measure the volume of starch solution and amylase solution. • Use of timer to record equal intervals between samples. • Use of iodine reagent to test for starch, including colour change to blue/black. • Identification of when starch is fully digested, because iodine remains orange/yellow. • Record the time taken for complete digestion by counting the number of wells tested positive for starch. • Repetition at different pH values. • Repetition of investigation, or comparison with other groups, and calculation of a mean.	
Total		**6**

Question 4

Question	Answers	Extra information	Mark
04.1	Any **three** from: • at rest/for the first 2 minutes the heart rate is constant at 60 beats per minute • while running/exercising the heart rate increases • from 60 to 130 beats per minute • the maximum heart rate reached is 130 beats per minute • when the exercise stops/at 7 minutes the heart rate decreases • the heart rate returns to 60 beats per minute/resting heart rate at 11 minutes/4 minutes after the person stopped running		3
04.2	Any **four** from: • to supply more blood to muscles • so more oxygen/glucose is supplied muscle cells (allow oxygenated blood) • for (aerobic) respiration • so more energy is released/transferred • for muscle contraction	Allow correct symbols for oxygen and glucose. Allow more carbon dioxide/CO_2 is removed from the muscle cells. Do **not** accept anaerobic respiration. Do **not** accept produced/created/made. Idea of more/increased must be mentioned at least once for full marks. If no other marks are awarded, allow **1** mark for reference to blood/oxygen/glucose reaching muscle cells.	4

Question 4

04.3	Any **four** from: • the heart rate stays high • the breathing rate stays high • to supply the oxygen needed to pay off the oxygen debt • lactic acid is transported back to the liver (via the blood) • where it reacts with the oxygen to form glucose	Allow correct symbols for oxygen and glucose.	4
Total			**11**

Question 5

Question	Answers	Extra information	Mark
05.1	virus		1
05.2	measles is spread by inhalation of droplets from sneezes and coughs (young) children are less likely to cover their mouths/noses (when coughing/ sneezing) **or** (young) children are less likely to wash hands **or** (young) children have more contact with each other/play in closer proximity	Allow any sensible reason why the disease would spread quickly through a group of children.	1 1
05.3	Any **four** from: • (small amount of) dead/inactivate pathogen/measles/virus • injected/introduced to the body • white blood cells are stimulated • to produce antibodies • antibodies are specific to measles • if the virus re-enters the body, the correct antibodies are produced quickly • killing/destroying the virus/preventing infection		4
05.4	Any **two** from: • herd immunity/large proportion of the population immune • the spread of measles is reduced/ eliminated • protects people who can't have the vaccination		2
Total			**9**

Question 6

Question	Answers	Extra information	Mark
06.1	aorta carries oxygenated blood to (the rest of) the body pulmonary artery carries deoxygenated blood to the lungs	Answers in this order only.	1 1 1 1
06.2	**Level 2:** Some logically linked reasons are given. There may also be a simple judgement.		3-4
	Level 1: Relevant points are made. They are not logically linked.		1-2
	No relevant content.		0
	Indicative content: **Advantages of mechanical valves:** • Mechanical valves last longer than biological valves. • Some patients have personal reasons for not wanting to use biological valves which are taken from animals. • Mechanical valves are cheaper than biological valves to fit. **Disadvantages of mechanical valves:** • Blood clots are likely to form on mechanical valves, which can lead to strokes. • Patients will need to take blood thinning drugs for the rest of their lives to prevent blood clots. • Mechanical valves will have ongoing costs due to drugs.		
06.3	statins reduce blood cholesterol levels which slows down the rate that fatty material is deposited (in blood vessels)		1 1
Total			**10**

Question 7

Question	Answers	Extra information	Mark
07.1	70 × 400		1
	= 28 000 (μm)	An answer of 28 000 (μm) with no working scores **2** marks.	1
	2.8×10^4 (μm)	An answer of 2.8×10^4 (μm) with no working scores **3** marks.	1
07.2	left-hand side: water		1
	right-hand side: glucose **and** oxygen	Answers in either order.	1
07.3	$\frac{1}{25^2}$	An answer of 0.0016 (arbitrary units) with no working scores **2** marks.	1
	= 0.0016 (arbitrary units)		1
07.4	it will be quartered/decrease by a quarter/ decrease by a factor of four		1
07.5	as the temperature increases from 0°C to 10°C, the rate of photosynthesis increases for both 0.04% carbon dioxide and 1% carbon dioxide	Allow reference to section **A** instead of 0°C and 10°C.	1
	because temperature is the limiting factor		1
	as the temperature increases from 15°C to 35°C, the rate of photosynthesis continues to increase for 1% carbon dioxide but levels off for 0.04% carbon dioxide	Allow reference to section **B** instead of 10°C and 35°C.	1
	because carbon dioxide is the limiting factor	Allow CO_2 for carbon dioxide.	1
Total			**12**