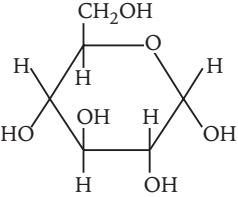


# A Level AQA Biology

## 10 Exchange of substances – answers

Question	Answers	Extra information	Mark	AO Spec reference
01.1	3.0;		1	AO2 3.1.4.2
01.2	the highest relative enzyme activity is at pH3 and there are small error bars that do not overlap with other data points;		1	AO3 3.1.4.2
01.3	$\left(\frac{95 - 55}{95}\right) \times 100;$ 42.1% ;		2	AO2 3.1.4.2 MS 1.4
01.4	hydrolyses peptide bond between the amino acids of dipeptides ; forms two (individual) amino acids;		2	AO2 3.3.3
01.5	removes terminal amino acids;	Accept alternative wording	1	AO1 3.3.3
02.1		1 mark for correct position of hydroxyl (OH) groups;  1 mark for the remainder of the structure being correct;	2	AO1 3.1.2
02.2	Any four from: amylase is a digestive enzyme in the pancreas; that causes the breakdown of maltose to glucose in the small intestine; hydrolysis (to form two glucose monomers); these (glucose monomers) can then be absorbed into the bloodstream by the small intestine; correct reference to the stomach's role in digestion;	Such as the role of hydrochloric acid	4 max	AO1 3.3.3

# A Level AQA Biology

## 10 Exchange of substances – answers

Question	Answers	Extra information	Mark	AO Spec reference
03.1	$\begin{array}{c} \text{R} \\   \\ \text{H}_2\text{N}-\text{C}-\text{COOH} \\   \\ \text{H} \end{array}$	<p>1 mark for either having the correct amine or carboxylic acid group;</p> <p>1 mark for the rest of the structure being correct;</p>	2	AO1 3.1.4.1
03.2	A biuret test detects the presence of (peptide bonds found in) proteins; The solution turns purple if proteins are present;		2	AO1 3.1.4.1
03.3	Any two from: coiled structure / alpha helix / beta pleated sheets; weak hydrogen bonds; flexible helix;	Allow correct reference to alpha helix	2 max	AO1 3.1.4.1
03.4	peptide bonds are hydrolysed; polypeptides broken down by endopeptidases; terminal amino acids are removed by exopeptidases;		3	AO2 3.3.3
03.5	$\left(\frac{0.71}{100}\right) \times 240;$ $\frac{1.704}{4};$ $= 0.43 \text{ kJ};$	Divide by 4 to reach 25% - accept other methods to do this	3	AO3 3.3.3 MS 3.5
04.1	one molecule of glycerol <b>AND</b> <u>three</u> fatty acids; joined by <u>condensation</u> reaction to form ester bonds;	Both the correct reference to the number of glycerol and fatty acids are needed for this mark	2	AO1 3.1.3
04.2	emulsification of triglycerides; (the micelles emulsify) larger fatty globules to smaller globules;		2	AO2 3.3.3

# A Level AQA Biology

## 10 Exchange of substances – answers

Question	Answers	Extra information	Mark	AO Spec reference
04.3	acetates from the breakdown of fatty acids from lipids; can enter the Krebs cycle;		2	AO3 3.5.2
04.4	crush sample; add to (a tube containing) ethanol; white emulsion formed if triglycerides are present;		3	AO1 3.3.3
05.1	beta cells do not produce (enough) insulin;		1	AO1 3.6.4.2
05.2	insulin attaches to receptors; on the plasma membrane of target cells; causes glucose channels to be added to the cell surface membrane; enzymes activated to convert glucose to glycogen;	Allow GLUT channels	4	AO2 3.6.4.2
05.3	fructose is (the preferred option and this is) a monosaccharide; digested (directly) into the bloodstream from the small intestine; whereas maltose is a disaccharide; (and) would need to be broken down first;		4	AO3 3.1.2 3.3.3 3.6.4.2
06.1	tertiary (protein) structure;		1	AO1 AO2 3.1.4.1
06.2	ionic bonds between side chains; strong covalent bonds (disulfide bridges);		2	AO1 AO2 3.1.4.1
06.3	gluten is recognised as the antigen; T helper cells stimulate cytotoxic T cells; plasma cells secrete antibodies to form an antigen-antibody complex;		3	AO1 AO2 3.2.4

# A Level AQA Biology

## 10 Exchange of substances – answers

Question	Answers	Extra information	Mark	AO Spec reference												
06.4	$\frac{1004 \times 5.2}{100}$ ; 52;		2	AO2 3.3.3 MS 6.3												
06.5	Any one from: reduced abdominal pain / discomfort; reduced bloating; reduced constipation; reduced flatulence; increased energy levels;	List rule applies	1 max	AO3 3.3.3												
06.6	Any two from: small sample size (relative to the UK population); no specific criteria other than over 16 years; self-reported symptoms;	Allow the idea that people might not tell the truth, or the placebo affect (if qualified)	2 max	AO3 3.3.3												
07	<p>The following are suitable topic areas from the specification that could be used to discuss the role of glucose in energy flow through the human food chain.</p> <p>In order to fully address the question and reach the highest mark bands students must also include at least five topics in their answer, to demonstrate a synoptic approach to the essay.</p> <table border="1"> <thead> <tr> <th>Specification reference</th> <th>Topic area</th> </tr> </thead> <tbody> <tr> <td>3.1.2</td> <td>Carbohydrates</td> </tr> <tr> <td>3.3.3</td> <td>Digestion and absorption</td> </tr> <tr> <td>3.3.4.2</td> <td>Transport in plants</td> </tr> <tr> <td>3.5.1</td> <td>Photosynthesis</td> </tr> <tr> <td>3.5.2</td> <td>Respiration</td> </tr> </tbody> </table>	Specification reference	Topic area	3.1.2	Carbohydrates	3.3.3	Digestion and absorption	3.3.4.2	Transport in plants	3.5.1	Photosynthesis	3.5.2	Respiration		25	AO1 3.1.2 3.3.3 3.3.4.2 3.5.1 3.5.2 3.5.3
Specification reference	Topic area															
3.1.2	Carbohydrates															
3.3.3	Digestion and absorption															
3.3.4.2	Transport in plants															
3.5.1	Photosynthesis															
3.5.2	Respiration															

# A Level AQA Biology

## 10 Exchange of substances – answers

Question	Answers	Extra information	Mark	AO Spec reference				
	<table border="1"> <tr> <td>3.5.3</td> <td>Energy and ecosystems</td> </tr> <tr> <td>3.6.4.2</td> <td>Control of blood glucose concentration</td> </tr> </table> <p>Students may be able to show the relevance of other topics from the specification.</p> <p><b>Note:</b> other topics from beyond the specification can be used, providing they relate to the title and contain factually correct material of at least an A-level standard. Credit should not be given for topics beyond the specification which are below A-level standard.</p>	3.5.3	Energy and ecosystems	3.6.4.2	Control of blood glucose concentration			
3.5.3	Energy and ecosystems							
3.6.4.2	Control of blood glucose concentration							

### Skills box answers

Question	Answer
1	<p><b>temperature:</b> carry out investigation in thermostatically controlled water bath</p> <p><b>pectinase solution:</b> volumes constant and use same concentration and stock solution throughout investigation</p> <p><b>apple:</b> use same variety and age of apple throughout; peel and core apple; use same sized pieces</p> <p><b>timing:</b> the time intervals must be constant for all tests</p>
2	<p><b>temperature:</b> carry out investigation in thermostatically controlled water bath</p> <p><b>milk:</b> use same batch throughout (e.g. full-fat UHT); use same volume throughout investigation</p> <p><b>lipase, bile salts, phenolphthalein, sodium carbonate:</b> volumes constant and use same concentration throughout investigation</p> <p>establish colour change end point so the investigation is stopped at the same point for each test (difficult because colour change is subjective; could use pH meter)</p>