Digestion and Absorption: AQA A Level Biology Exam Questions by Top

17 questions · 49 marks · about 64 minutes. Answer in the spaces, then check the mark schemes at the end.

Question 1 · AS Paper 2 · June 2018 · Q07.1 · 2 marks

0 7 . 1 What is digestion?

[2 marks]

Question 2 · AS Paper 1 · June 2024 · Q02.1 · 4 marks

0 2 . 1 **Table 2** contains information on the digestion of two biological molecules.

Complete **Table 2**.

[4 marks]

Table 2

Biological molecule	Enzyme	Name of bond hydrolysed	Product of digestion
Starch			Maltose
Dipeptide	Dipeptidase		

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Question 3 · A level Paper 1 · June 2022 · Q09.3 · 4 marks

0 9 . 3 Describe the complete digestion of starch by a mammal.

[4 marks]

Question 4 · AS Paper 2 · June 2016 · Q01.1 · 1 mark

0 1 . 1 Endopeptidases and exopeptidases are involved in the hydrolysis of proteins.

Name the other type of enzyme required for the complete hydrolysis of proteins to amino acids.

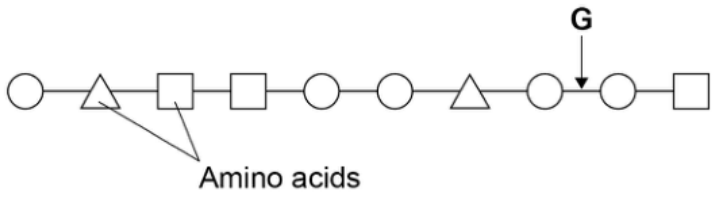
[1 mark]

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Question 5 · AS Paper 1 · November 2021 · Q05.2 · 1 mark

Figure 5 shows the primary structure of part of a polypeptide. Each shape represents an amino acid. Identical amino acids have the same shape.

Figure 5



0 5 . 2 Name the type of peptidase which will hydrolyse the bond labelled **G** in **Figure 5**.

[1 mark]

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Question 6 · AS Paper 2 · June 2019 · Q01.1 · 4 marks

0 1 . 1 Describe the role of enzymes in the digestion of proteins in a mammal.

[4 marks]

[Extra space]

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Question 7 · A level Paper 3 · November 2021 · Q05.1 · 2 marks

0 5 . 1 The action of endopeptidases and exopeptidases can increase the rate of protein digestion. Describe how.

[2 marks]

Question 8 · AS Paper 2 · June 2023 · Q06.1 · 2 marks

0 6 . 1 Describe the hydrolysis reactions involved in the digestion of triglycerides.

Do **not** write about the activity of lipase.

[2 marks]

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Question 9 · AS Paper 2 · June 2023 · Q06.2 · 2 marks

0 6 . 2 All mammals produce a lipase called CEL.

CEL digests triglycerides.

CEL is activated by bile salts binding to the enzyme.

Describe **two** other functions of bile salts.

[2 marks]

1 _____

_____

_____

2 _____

_____

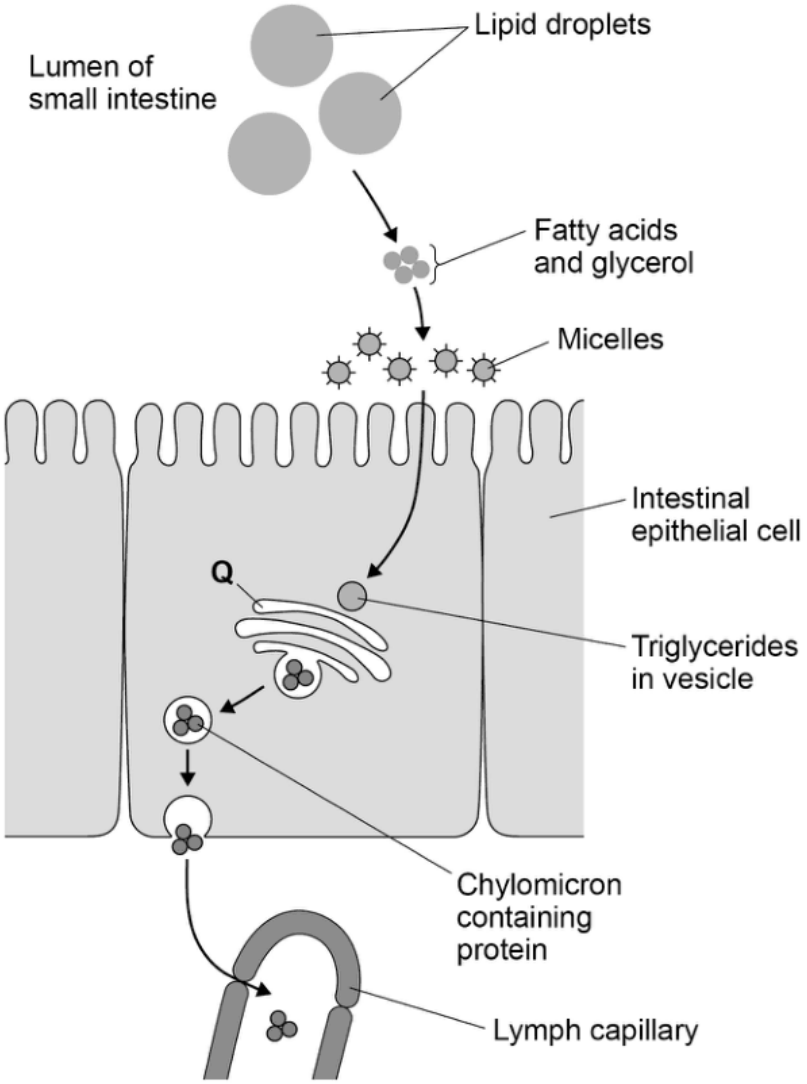
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Question 10 · information from earlier in the question

0 3 **Figure 2** outlines the digestion and absorption of lipids.

Figure 2



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Question 10 · AS Paper 1 · June 2017 · Q03.2 · 3 marks

0 3 . 2 Explain the advantages of lipid droplet and micelle formation.

[3 marks]

[Extra space]

Question 11 · AS Paper 1 · June 2022 · Q01.2 · 4 marks

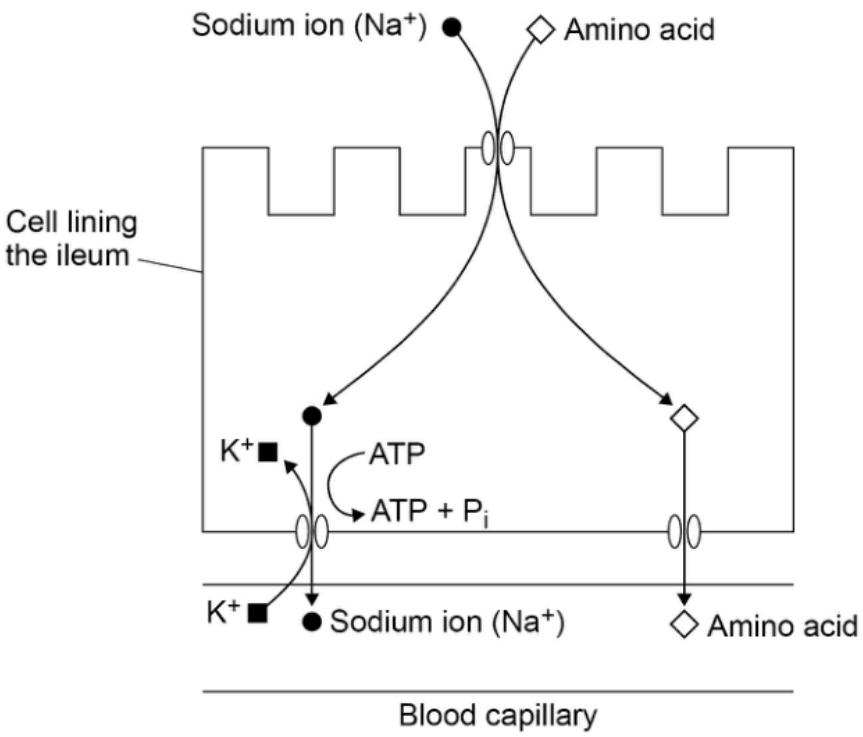
0 1 . 2 Describe the mechanism for the absorption of amino acids in the ileum.

[4 marks]

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0 1 . 3 **Figure 1** shows the co-transport mechanism for the absorption of amino acids into the blood by a cell lining the ileum.

Figure 1



The addition of a respiratory inhibitor stops the absorption of amino acids.

Use **Figure 1** to explain why.

[3 marks]

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Question 13 · A level Paper 1 · November 2020 · Q02.3 · 3 marks

0 2 . 3 Describe the role of micelles in the absorption of fats into the cells lining the ileum.

[3 marks]

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Question 14 · AS Paper 2 · November 2020 · Q09.1 · 5 marks

0 9 . 1 Describe the processes involved in the absorption and transport of digested lipid molecules from the ileum into lymph vessels.

[5 marks]

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0 2 To study lipid digestion, a scientist placed a tube into the gut of a healthy 20-year-old man. The end of the tube passed through the stomach but did not reach as far as the ileum.

The scientist fed the man a meal containing triglycerides through the tube.
The scientist also used the tube to remove samples from the man's gut at intervals after the meal.

The scientist measured the type of lipid found in the samples. Some of her results are shown in **Table 1**.

Table 1

Sample	Time of collection after meal / min	Concentration of fatty acids / mg cm^{-3}	Concentration of triglycerides / mg cm^{-3}
A	45	2.7	0.6
B	75	3.3	0.0

0 2 . 1 Use your knowledge of lipid digestion to explain the differences in the results for samples **A** and **B** shown in **Table 1**.

You should assume that **no** absorption had occurred.

[3 marks]

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Question 16 · A level Paper 1 · June 2024 · Q02.3 · 3 marks

0 2 . 3 Vitamin A is a fat-soluble substance.

Micelles are involved in the process of vitamin A absorption.

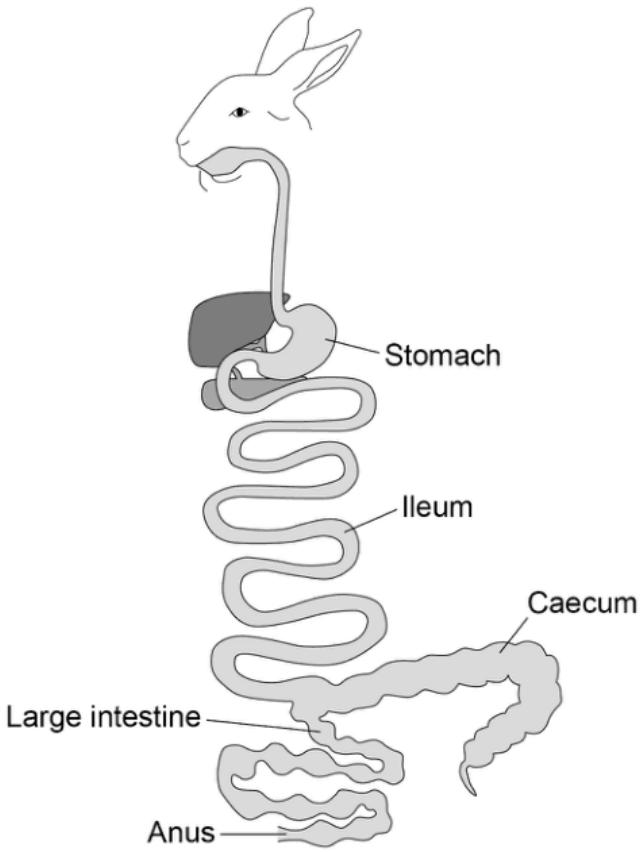
Describe the process of vitamin A absorption into cells lining the ileum.

[3 marks]

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The digestive system of a rabbit is shown in **Figure 2**.

Figure 2



0 1 . 3 The food eaten by a rabbit is digested mainly by microorganisms in its caecum. The caecum is a section of intestine attached between the ileum and the large intestine. The resulting semi-digested material leaves the anus of a rabbit as soft, caecal droppings. The rabbit then eats these caecal droppings.

Use this information and **Figure 2** to suggest how eating its own caecal droppings helps a rabbit's digestion and absorption of dietary protein.

[3 marks]

[Extra space]

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Mark schemes

Question 1 · AS Paper 2 · June 2018 · Q07.1 · 2 marks

07.1	1. Hydrolysis (of); 2. (Large / insoluble substances) to small(er) / soluble substances;	2	Ignored named examples Accept polymer to monomer

Question 2 · AS Paper 1 · June 2024 · Q02.1 · 4 marks

02.1

1. Amylase;
2. Glycosidic;
3. Peptide;
4. Amino acid(s);

Biological molecule	Enzyme	Name of bond hydrolysed	Product of digestion
	Amylase	Glycosidic	
		Peptide	Amino acid(s)

4 (4 x AO1)	3. Reject dipeptide/ polypeptide bond

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Question 3 · A level Paper 1 · June 2022 · Q09.3 · 4 marks

09.3	1. Hydrolysis; 2. (Of) glycosidic bonds; 3. (Starch) to maltose by amylase; 4. (Maltose) to glucose by disaccharidase/maltase; 5. Membrane-bound (disaccharidase/maltase);	4 max (4 x AO1)

Other than 5., do not penalise incorrect site for digestion or incorrect site of enzyme production 5. Accept microvilli for membrane

Question 4 · AS Paper 2 · June 2016 · Q01.1 · 1 mark

01.1	Dipeptidase/s;	1	Accept: membrane bound dipeptidase/s.

Question 5 · AS Paper 1 · November 2021 · Q05.2 · 1 mark

05.2	Endo(peptidase);	1	Correct spelling

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Question 6 · AS Paper 2 · June 2019 · Q01.1 · 4 marks

01.1	1. (Reference to) hydrolysis of peptide bonds; 2. Endopeptidase act in the middle of protein/polypeptide **OR** Endopeptidase produces short(er) polypeptides/ increase number of ends; 3. Exopeptidases act at end of protein/polypeptide **OR** Exopeptidase produces dipeptides/amino acids; 4. Dipeptidase acts on dipeptide/between two amino acids **OR** Dipeptidase produces (single) amino acids;	4	Accept chain/chain of amino acids/peptide for polypeptide Accept digest/breakdown/ break for 'act' Mark points 2, 3 and 4 **reject** answers where substrate or product is incorrect eg 'Endopeptidase produces dipeptides' Ignore references to source and location of enzymes

Question 7 · A level Paper 3 · November 2021 · Q05.1 · 2 marks

05.1	1. Exopeptidases hydrolyse peptide bonds at the ends of a polypeptide/protein **AND** endopeptidases hydrolyse internal peptide bonds within a polypeptide/protein; 2. More 'ends' **OR** More surface area;	2	1. Reference to 'hydrolyse' required at least once 2. Accept even if via action of incorrect enzyme

Question 8 · AS Paper 2 · June 2023 · Q06.1 · 2 marks

06.1	1. Breaking of ester bonds; 2. By addition of water;	2 (2 x AO1)	2. Accept 'using', 'with' for addition

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Question 9 · AS Paper 2 · June 2023 · Q06.2 · 2 marks

06.2	1. Emulsify lipids/fats; 2. Increases surface area (of lipid/fat) for (increased) lipase activity; 3. Form micelles;

2 max (2 x AO1)	1. Allow descriptions Ignore 'neutralise'/ 'increase the pH'

Question 10 · AS Paper 1 · June 2017 · Q03.2 · 3 marks

03.2	1. **Droplets** increase surface areas (for lipase / enzyme action); 2. (So) faster hydrolysis / digestion (of triglycerides / lipids); 3. **Micelles** carry fatty acids and glycerol / monoglycerides to / through membrane / to (intestinal epithelial) cell;	3	1. Context is important 1. Reject micelles increase surface area 2. Ignore 'breakdown' 3.Ignore 'small enough' 3. Accept description of membrane 3. Reject any movement through membrane proteins

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01.2	1. Facilitated diffusion of amino acid (into cell when higher concentration in lumen); 2. Co-transport; 3. Sodium ions actively transported from cell to blood/capillary/tissue fluid; 4. Creating sodium ion concentration/diffusion gradient; 5. Facilitated diffusion of amino acid into blood/capillary;	4 max (4 x AO1)

1. and 5. Accept diffusion via channel/carrier proteins for 'facilitated diffusion'
3. Accept 'pumped' for transported
3. and 4. Accept Na^+ for sodium ion(s)
3. and 4. Max 1 if ions not mentioned

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Question 12 · AS Paper 2 · June 2016 · Q01.3 · 3 marks

01.3	1. No/less ATP produced **OR** No active transport; 2. Sodium (ions) not moved (into/out of cell); 3. No diffusion gradient for sodium (to move into cell with amino acid) **OR** No concentration gradient for sodium (to move into cell with amino acid);	3	Accept: converse for all three points. 2. Accept: sodium (ions) increase in cell. 2. Accept: sodium (ions) cannot diffuse into cell. Note: no active transport of sodium (ions) equals 2 marks.

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Question 13 · A level Paper 1 · November 2020 · Q02.3 · 3 marks

02.3	1. Micelles include bile salts and fatty acids; 2. Make the fatty acids (more) soluble in water; 3. Bring/release/carry fatty acids to cell/lining (of the ileum); 4. Maintain high(er) concentration of fatty acids to cell/lining (of the ileum); 5. Fatty acids (absorbed) by <u>diffusion</u>;

3 max	1. Ignore other correct components of micelles. 2 and 3 only. For 'fatty acids' accept fats/lipids. 5. Reject if absorbed by facilitated diffusion 5. Ignore if micelles themselves are being absorbed. Ignore references to monoglycerides.

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Question 14 · AS Paper 2 · November 2020 · Q09.1 · 5 marks

09.1	1. Micelles contain bile salts and fatty acids/monoglycerides; 2. Make fatty acids/monoglycerides (more) soluble (in water) **OR** Bring/release/carry fatty acids/monoglycerides to cell/lining (of the iluem) **OR** Maintain high(er) concentration of fatty acids/monoglycerides to cell/lining (of the ileum); 3. Fatty acids/monoglycerides absorbed by <u>diffusion</u>; 4. Triglycerides (re)formed (in cells); 5. Vesicles move to cell membrane;	5

1. Ignore other correct components of micelles
2. Accept lipid/fat for fatty acid/ monoglyceride
3. Reject if absorbed by facilitated diffusion
3. Ignore if micelles themselves are being absorbed
4. Accept chylomicrons form
5. Accept exocytosis for 'vesicles move'

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Question 15 · A level Paper 1 · November 2020 · Q02.1 · 3 marks

02.1	1. Triglycerides decrease **because** of the action of <u>lipase</u> OR Fatty acids increase **because** of the action of <u>lipase</u>; 2. Triglycerides decrease **because** of hydrolysis (of triglycerides) OR Fatty acids increase **because** of hydrolysis (of triglycerides); 3. Triglycerides decrease **because** of digestion of <u>ester</u> bonds (between fatty acid and glycerol) OR Fatty acids increase **because** of digestion of <u>ester</u> bonds (between fatty acid and glycerol);	3

Triglycerides decreasing or fatty acids increasing only need to be stated once.

Accept 'lower/higher/quoted numbers' for 'decrease/increase'.

Only withhold one mark if there is no/incorrect reference to triglycerides decreasing or fatty acids increasing.

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Question 16 · A level Paper 1 · June 2024 · Q02.3 · 3 marks

02.3	1. Combine/mix/join with bile salts; 2. Make (more) soluble (in water); 3. (Micelles) breakdown close to cells **OR** Maintain high(er) concentration at cell(-surface membrane) **OR** Transport to cells/lining; 4. Diffuses (into cells/ileum);	3 max (3 x AO2)	Max 2 if context is related to digestion of vitamin A to phospholipids **OR** monoglycerides **OR** fatty acids Ignore emulsification of vitamin A 3. Accept 'fuse with' for 'breakdown close to' 4. Ignore facilitated 4. Ignore micelles are absorbed

Question 17 · AS Paper 2 · June 2019 · Q01.3 · 3 marks

01.3	1. More/remaining/undigested (protein) broken down; 2. (So more) amino acids absorbed; 3. (Because) protein/food passes again through stomach/ileum;
TOTAL	

3	1. Accept all (protein) broken down
10	

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