

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

### Questions

Q1.

Lipids and carbohydrates are found in both plants and animals.

The carbohydrate content of vegetables ranges from 3 to 35%. However, meat contains little to no carbohydrate. Milk is the only food source from animals that contains a significant amount of carbohydrate.

Although plant material contains a higher proportion of carbohydrate than animal tissues, it has been claimed that carbohydrates are more important to animals than they are to plants.

Assess the relative importance of carbohydrates to plants and animals.

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**(Total for question = 9 marks)**

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q2.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .

Different compounds have been given different sweetness values by comparing them with the sweetness of sucrose.

The table shows some of these compounds and their sweetness values.

Name	Type of compound	Sweetness value / a.u.
Maltose	Disaccharide	0.39
Glucose	Monosaccharide	0.77
Sucrose	Disaccharide	1.00
Sucralose	Modified disaccharide	600.00
Thaumatococcus	Protein	2000.00

- (i) Lactose is found in milk. The sweetness value of lactose is 0.16.  
Calculate the ratio of the sweetness value of sucrose to lactose.

(2)

Answer .....

- (ii) Which of the following describes lactose?

(1)

- A disaccharide  
 B modified disaccharide  
 C monosaccharide  
 D protein

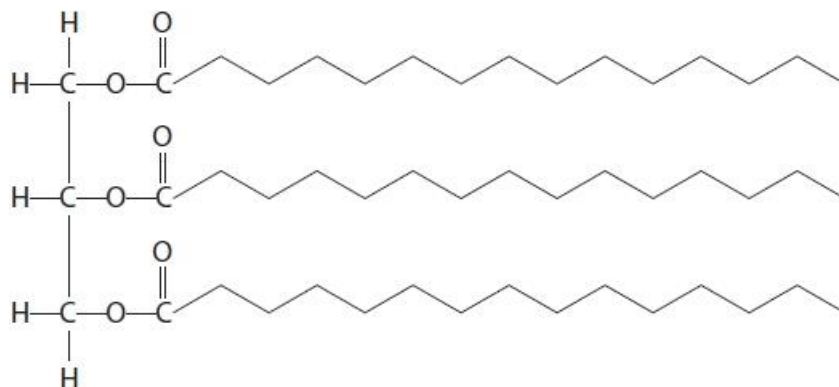
(Total for question = 3 marks)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q3.

Lipids and carbohydrates are found in both plants and animals.

The diagram shows a triglyceride.



(i) On the diagram, draw a circle around an ester bond.

(1)

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(ii) The fatty acids shown on the diagram are saturated.

Describe how the diagram would be different if one of the fatty acids was unsaturated.

(2)

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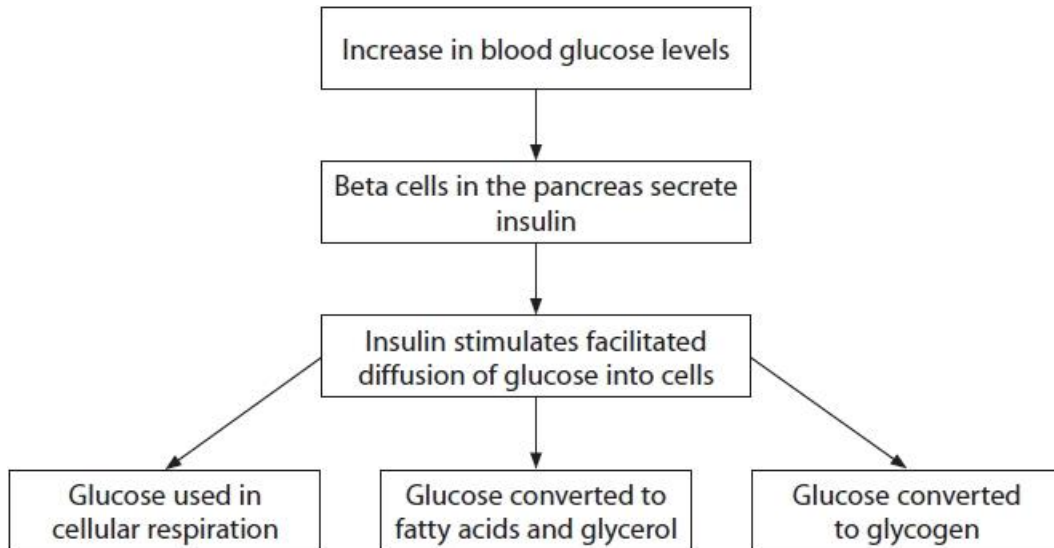
**(Total for question = 3 marks)**

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q4.

The internal conditions within the body are maintained by homeostatic mechanisms. The regulation of blood glucose involves homeostatic mechanisms.

The diagram shows part of the sequence of events when there is an increase in blood glucose levels.



(i) Describe how glucose moves into cells by facilitated diffusion.

(2)

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(ii) Explain how the structure of glycogen allows it to be an energy store.

(3)

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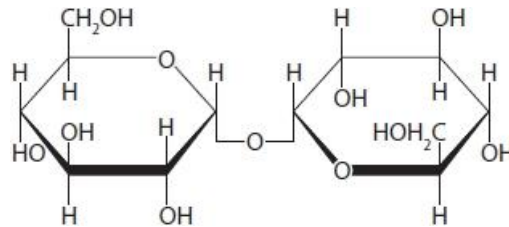
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(Total for question = 5 marks)

Q5.

Maltose and trehalose are disaccharides. Trehalose is formed from two molecules of  $\alpha$ -glucose.

The diagram shows a molecule of trehalose.



(i) Describe the reaction that joins two  $\alpha$ -glucose molecules to form a disaccharide.

(2)

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(ii) Compare and contrast the structures of trehalose and maltose.

(2)

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(Total for question = 4 marks)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q6.

Answer the questions with a cross in the boxes you think are correct . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .

Starch is an important component of the human diet.

The main sources of starch are plants such as maize and potatoes.

(i) Starch is composed of amylose and amylopectin.

Which of the following terms is the correct description of amylose?

(1)

- A disaccharide
- B monosaccharide
- C polysaccharide
- D trisaccharide

(ii) Starch can be broken down by a

(1)

- A condensation reaction involving ester bonds
- B condensation reaction involving glycosidic bonds
- C hydrolysis reaction involving ester bonds
- D hydrolysis reaction involving glycosidic bonds

(iii) Give **one** structural difference between amylose and amylopectin.

(1)

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**(Total for question = 3 marks)**

**Edexcel Biology A-level - Energy, Carbohydrates and Fats**

**Q7.**

Explain how the structures of amylopectin and glycogen make them suitable for storing energy.

**(3)**

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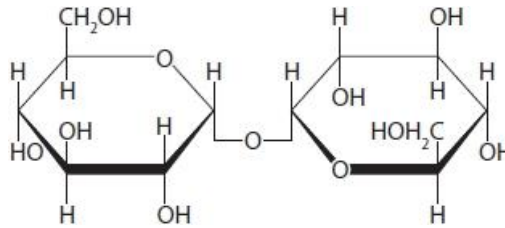
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**(Total for question = 3 marks)**

Q8.

Maltose and trehalose are disaccharides. Trehalose is formed from two molecules of  $\alpha$ -glucose.

The diagram shows a molecule of trehalose.



Some flying insects store trehalose and glycogen in their wing muscles.

(i) Trehalose is broken down to glucose by the enzyme trehalase.

Which of the following describes how glucose is produced from trehalose?

(1)

- A anabolism
- B catalysis
- C glycolysis
- D hydrolysis

(ii) Insect flight uses a lot of energy. Explain the advantage of insects storing both trehalose and glycogen.

(4)

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(Total for question = 5 marks)



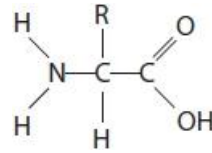
**Edexcel Biology A-level - Energy, Carbohydrates and Fats**

**Q9.**

Proteins can be used as a source of energy. This involves the removal of the amine group.

(i) Draw a circle around the amine group on the diagram of an amino acid.

(1)



(ii) The R group differs between the amino acids. The R group may contain elements that are not found in a carbohydrate.

Name one of these elements.

(1)

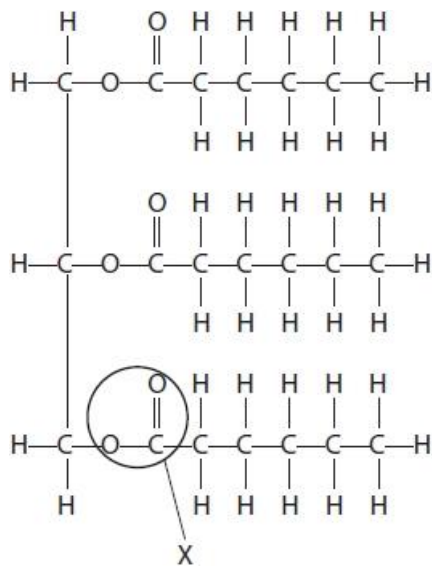
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**(Total for question = 2 marks)**

**Edexcel Biology A-level - Energy, Carbohydrates and Fats**

**Q10.**

The diagram shows a triglyceride molecule.



The triglyceride in the diagram can combine with protein to form a lipoprotein.

Explain the effect that large quantities of this lipoprotein would have on blood cholesterol levels.

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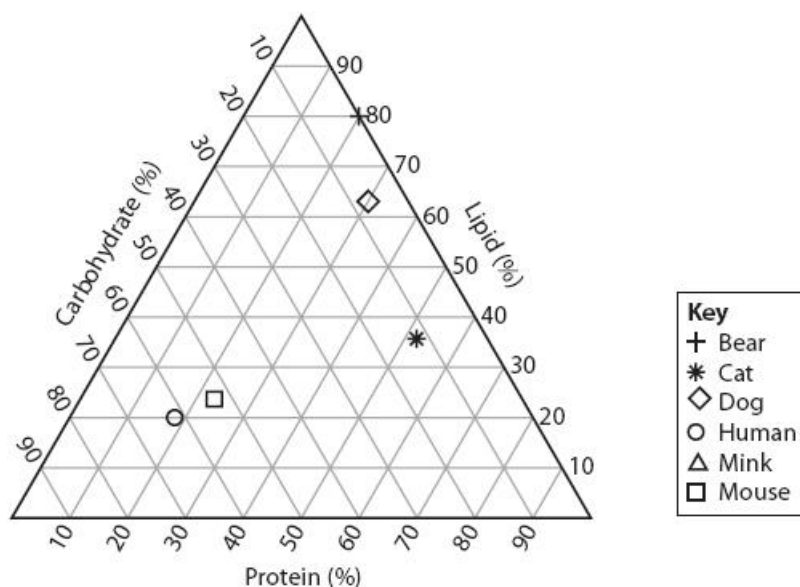
## Edexcel Biology A-level - Energy, Carbohydrates and Fats

### Q11.

The food we eat contains carbohydrates, lipids and proteins.

Mammals have diets containing different proportions of carbohydrates, lipids and proteins.

The diagram shows the composition of the average diet of some mammals.



(i) The diet of a dog contains 6% carbohydrate, 64% lipid and 30% protein. This is shown on the diagram as a diamond.

The diet of a mink contains 15% carbohydrate, 50% lipid and 35% protein.  
Plot this on the diagram.

(1)

(ii) Which mammal will have a diet containing food with the highest proportion of ester bonds?

(1)

- A bear
- B cat
- C human
- D mouse

(Total for question = 2 marks)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q12.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .

Monosaccharides join to form disaccharides and polysaccharides.

(i) State the type of reaction where two monosaccharides join to form a disaccharide molecule.

(1)

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(ii) Which of the following bonds joins two monosaccharides to form a disaccharide molecule?

(1)

- A ester
- B glycosidic
- C hydrogen
- D peptide

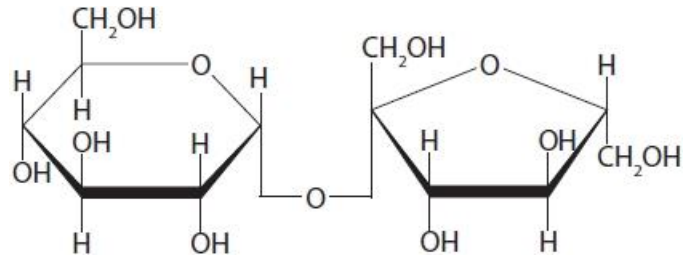
(Total for question = 2 marks)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q13.

Monosaccharides join to form disaccharides and polysaccharides.

The diagram shows a molecule of sucrose.



(i) Draw the two monosaccharides that are produced when a molecule of sucrose is broken down.

(2)

(ii) Name the two monosaccharides that are produced when sucrose is broken down.

(1)

1 .....

2 .....

**(Total for question = 3 marks)**

**Q14.**

Monosaccharides join to form disaccharides and polysaccharides.

Compare and contrast the structure of a disaccharide with glycogen.

**(4)**

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**(Total for question = 4 marks)**

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

**Q15.**

Glycogen and starch can be hydrolysed by enzymes.

Which row shows the correct features of the structure of glycogen?

(1)

<input type="checkbox"/> <b>A</b>	1,4-glycosidic bonds only	branched
<input type="checkbox"/> <b>B</b>	1,6-glycosidic bonds only	unbranched
<input type="checkbox"/> <b>C</b>	1,4-glycosidic bonds and 1,6-glycosidic bonds	branched
<input type="checkbox"/> <b>D</b>	1,4-glycosidic bonds and 1,6-glycosidic bonds	unbranched

**(Total for question = 1 mark)**

**Edexcel Biology A-level - Energy, Carbohydrates and Fats**

**Q16.**

Mucopolysaccharides are complex molecules found in the human body.

Mucopolysaccharides can be broken down by enzymes.

Describe how an enzyme could break down the polysaccharide component of mucopolysaccharides.

(2)

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**(Total for question = 2 marks)**



**Edexcel Biology A-level - Energy, Carbohydrates and Fats**

**Q17.**

Mucopolysaccharides are complex molecules found in the human body.

Mucopolysaccharides are large molecules containing unbranched polysaccharides.

Describe the structure of an unbranched polysaccharide.

**(2)**

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**(Total for question = 2 marks)**

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

### Q18.

Blood plasma contains glucose dissolved in water. Glucose is a polar molecule that is taken up by muscle cells and used in the synthesis of glycogen.

Glucose is used in the synthesis of glycogen in muscle cells.

(i) Describe the formation of glycogen from glucose.

(2)

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(ii) Describe how the structure of glycogen is related to its function as a storage molecule.

(2)

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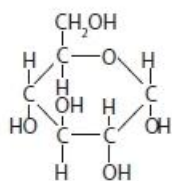
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**(Total for question = 4 marks)**

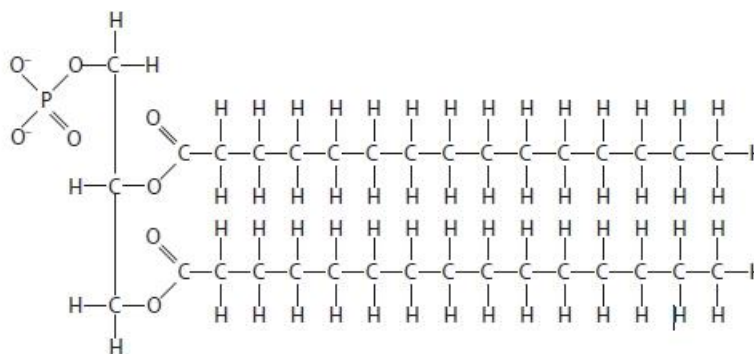
# Edexcel Biology A-level - Energy, Carbohydrates and Fats

**Q19.**

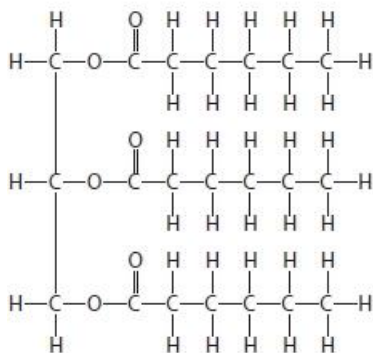
The diagram shows four molecules that can be found in living organisms.



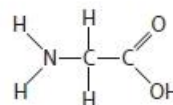
**A**



**B**



**C**



**D**

(i) How many of these molecules contain three elements only?

(1)

- A** one
- B** two
- C** three
- D** four

(ii) State how an unsaturated lipid differs from molecule **C**.

(1)

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## Edexcel Biology A-level - Energy, Carbohydrates and Fats

(iii) Which of these molecules is transported by tRNA?

(1)

A

B

C

D

(iv) Which of these molecules could be joined to another molecule of the same type by a peptide bond?

(1)

A

B

C

D

(v) Which of these molecules is a component of maltose?

(1)

A

B

C

D

**(Total for question = 5 marks)**

**Edexcel Biology A-level - Energy, Carbohydrates and Fats**

**Q20.**

The food we eat contains carbohydrates, lipids and proteins.

Carbohydrates, lipids and proteins can be used as sources of energy.

The table shows the average daily energy requirements for boys and girls aged 13 to 18.

Age / years	Daily energy requirement / kJ	
	Boys	Girls
13	10090	9292
14	10989	9789
15	11787	9990
16	12389	10090
17	12886	10291
18	13187	10291

(i) Calculate the percentage increase in the average daily energy requirements for boys aged 17 compared with their energy requirements aged 13.

(2)

Answer ..... %

(ii) Many foods are labelled in kilocalories (kcal). One calorie is equal to 4.18 joules.

Which of the following is the average energy requirements for girls aged 13 in kilocalories (kcal)?

(1)

- A** 2.223 kcal
- B** 222.3 kcal
- C** 2223 kcal
- D** 2 223 000 kcal

(iii) State what will happen to the additional energy if an individual takes in more energy than is required.

(1)

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**(Total for question = 4 marks)**

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

**Q21.**

The incidence of obesity is increasing in some populations.

High levels of sugars, such as fructose, in processed food could be contributing to this increase.

Explain why high levels of sugars in a person's diet could lead to obesity.

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**(Total for question = 3 marks)**

**Mark Scheme**

Q1.

Question Number	Indicative content
*	<p>Answers will be credited according to candidates' deployment of knowledge and understanding of material in relation to the qualities and skills outlined in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material which is relevant. Additional content included in the response must be scientific and relevant.</p> <p>Give examples of relevant biological knowledge and understanding:</p> <p>Evidence of isolated elements of biological knowledge:</p> <ul style="list-style-type: none"> <li>• glucose for respiration in both</li> <li>• starch for energy storage in plants /glycogen for energy storage in animals</li> <li>• cellulose for cell walls in plants</li> </ul> <p>Evidence of adequate biological knowledge with linkages made</p> <ul style="list-style-type: none"> <li>• starch composed of amylose and amylopectin in plants</li> <li>• sucrose as a transport sugar in phloem in plants, glucose in animals</li> <li>• lactose in milk for energy</li> <li>• a judgement on the importance of carbohydrates in plants and animals is made e.g. cellulose as a structural carbohydrate in plants therefore a greater proportion of carbohydrate in plants than animals or animals require more energy, therefore need more carbohydrate</li> </ul> <p>Evidence for comprehensive biological knowledge and understanding with sustained linkages</p> <ul style="list-style-type: none"> <li>• pentose sugars ribose and deoxyribose { in nucleic acids / DNA/ RNA / ATP} in both</li> <li>• ribulose as part of the Calvin cycle in plants</li> <li>• glycoprotein in { mucus / receptors on cell surface membranes /antibodies}</li> <li>• glycolipids in cell membranes</li> <li>• a supported judgement on the relative importance of carbohydrates in plants and animals is given e.g. animals store more energy in lipids than carbohydrate, therefore carbohydrate more important as a storage molecule in plants <b>or</b> the idea of carbohydrates as part of complex molecules <b>or</b> the proportion of carbohydrates present is not the same as importance</li> </ul>

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Level	Mark	Descriptor	Additional guidance
0	0	No awardable content	
1	1-3	Demonstrates isolated elements of biological knowledge and understanding to the given context with generalised comments made.  A conclusion may be attempted, demonstrating isolated elements of biological knowledge and understanding but with limited evidence to support the judgement being made.	Glucose for respiration Polysaccharides for energy storage Cellulose for plant cell walls  Simple conclusion made
2	4-6	Demonstrates adequate knowledge and understanding by selecting and applying some relevant biological facts/concepts.  A conclusion is made, demonstrating linkages to elements of biological knowledge and understanding, with occasional evidence to support the judgement being made.	Branched storage molecules for rapid energy release in starch Roles of sucrose, lactose  A judgement on the importance of carbohydrates in plants and animals is made
3	7-9	Demonstrates comprehensive knowledge and understanding by selecting and applying relevant knowledge of biological facts/concepts.  A conclusion is made, demonstrating sustained linkages to biological knowledge and understanding with evidence to support the judgement being made.	All of the above plus discussion of carbohydrates as part of complex molecules  A supported judgement on the relative importance of carbohydrates in plants and animals

Q2.

Question Number	Answer	Additional Guidance	Mark
(i)	<ul style="list-style-type: none"> <li>numbers inserted into equation correctly (1)</li> <li>correct ratio shown (1)</li> </ul>	<u>Example of calculation</u>  $1 \div 0.16$  $= 6.25:1$ ALLOW 25:4 or 12.5:2  1:6.25 gains one mark  Correct answer with no working gains full marks	(2)



## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Question Number	Answer	Mark
(ii)	<p>The only correct answer is A disaccharide</p> <p><i>B is incorrect because lactose is not a modified disaccharide</i></p> <p><i>C is incorrect because lactose is not a monosaccharide</i></p> <p><i>D is incorrect because lactose is not a protein</i></p>	(1)

Q3.

Question Number	Answer	Additional Guidance	Mark
(i)	<ul style="list-style-type: none"> <li>ester bond correctly identified (1)</li> </ul>		(1)

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>double bond between carbon atoms (1)</li> <li>a kink in the fatty acid chain (1)</li> </ul>	<p>ALLOW as a diagram if clear</p> <p>IGNORE double bonds unqualified</p> <p>ALLOW carbon-carbon double bond, C=C or double bond in the fatty acid chain</p> <p>ALLOW 'bend' in fatty acid chain</p> <p>ALLOW 'zigzag' for fatty acid chain</p>	(2)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q4.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>A description that makes reference to two of the following:</p> <ul style="list-style-type: none"> <li>carrier protein (in cell surface membrane)</li> <li>(glucose moves from) high to low concentration</li> <li>glucose binds to (carrier) protein / (carrier) protein changes shape to move glucose (across the membrane) (1)</li> </ul>	<p>IGNORE channel protein</p> <p>ALLOW 'down a concentration gradient'</p>	(2)

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> <li>polymer of glucose</li> <li>to provide glucose for respiration</li> <li>{branched / contains 1,6-glycosidic bonds / has many terminal ends} for rapid hydrolysis</li> <li>compact to allow large amount (of glucose / energy) to be stored in a small space / insoluble therefore no osmotic effect on cells</li> </ul>	<p>ALLOW polysaccharide /made of many glucose monomers DO NOT ALLOW <math>\beta</math>- glucose</p> <p>IGNORE 'easy to hydrolyse' ALLOW break down instead of hydrolyse</p>	(3)

Q5.

Question number	Answer	Additional guidance	Mark
(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none"> <li>condensation (1)</li> <li>involving OH groups (on both molecules) / water is formed (1)</li> </ul>		(2)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Question number	Answer	Additional guidance	Mark
(ii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>both are formed from two molecules of (<math>\alpha</math>)glucose / both contain a glycosidic bond (1)</li> <li>maltose has (<math>\alpha</math>-)1,4 linkage and trehalose has (<math>\alpha</math>-)1,1 linkage / in trehalose one of the glucose monomers is inverted (1)</li> </ul>	<p>ALLOW both are disaccharides of glucose DO NOT ALLOW <math>\beta</math> - glucose</p>	(2)

### Q6.

Question Number	Answer	Mark
(i)	<p><b>The only correct answer is C polysaccharide</b></p> <p><i>A is incorrect because amylose is not a disaccharide</i></p> <p><i>B is incorrect because amylose is not a monosaccharide</i></p> <p><i>D is incorrect because amylose is not a trisaccharide</i></p>	(1)

Question Number	Answer	Mark
(ii)	<p><b>The only correct answer is D hydrolysis reaction involving glycosidic bonds</b></p> <p><i>A is incorrect because starch does not contain ester bonds</i></p> <p><i>B is incorrect because starch does not contain ester bonds</i></p> <p><i>C is incorrect because condensation reactions join molecules together</i></p>	(1)

Question Number	Answer	Additional Guidance	Mark
(iii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>amylose is {unbranched / has only 1,4 glycosidic bonds}</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>amylopectin {is branched / has (1,4 and) 1,6 glycosidic bonds}</li> </ul>	<p>IGNORE coiled</p>	(1)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q7.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> <li>• branched therefore can be rapidly hydrolysed (to release glucose) (1)</li> <li>• compact so more (energy / glucose) can be stored (1)</li> <li>• insoluble therefore does not affect osmosis (1)</li> <li>• molecules too large to diffuse across cell surface membrane (1)</li> </ul>	<p>ALLOW branched therefore can be broken down quicker ignore easily</p> <p>ALLOW 'does not take up much space'</p> <p>ALLOW insoluble therefore does not affect water potential of cell</p> <p>ALLOW large molecules therefore remain in cells</p>	(3)

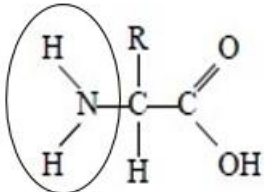
Q8.

Question number	Answer	Mark
(i)	<p><b>The only correct answer is D – hydrolysis</b></p> <p><i>A is not correct because anabolism is associated with forming more complex molecules</i></p> <p><i>B is not correct because catalysis is a general term for enzyme controlled reactions</i></p> <p><i>C is not correct because glycolysis is a sequence of reactions in respiration</i></p>	(1)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Question number	Answer	Additional guidance	Mark
(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> <li>glucose used in respiration to provide { energy / ATP } (1)</li> <li>glycogen is a polymer of glucose (1)</li> <li>glycogen has lots of { branches / terminal ends } so it can release glucose rapidly (1)</li> <li>breakdown of trehalose { makes two molecules of glucose available / provides a more immediate source of glucose } (1)</li> </ul>	<p>ALLOW glycogen contains lots of glucose</p> <p>ALLOW quickly hydrolysed</p>	(4)

### Q9.

Question Number	Answer	Additional Guidance	Mark
(i)	<ul style="list-style-type: none"> <li>amine group correctly circled on diagram</li> </ul>		(1)

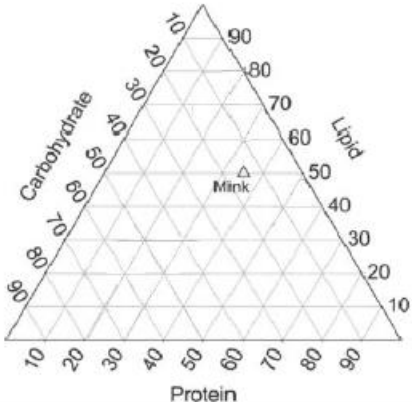
Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An answer which makes reference to the following:</p> <ul style="list-style-type: none"> <li>nitrogen / sulfur</li> </ul>	<p>ALLOW N or S sulphur</p>	(1)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q10.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to:</p> <ul style="list-style-type: none"> <li>increased (blood) cholesterol (1)</li> <li>(because) the triglyceride is saturated (1)</li> <li>The lipoprotein is an LDL (1)</li> </ul> <p>And one of the following:</p> <ul style="list-style-type: none"> <li>{ lipoproteins / LDLs } transport cholesterol (1)</li> <li>LDL binds to receptors (on cell surface membranes) / LDL accumulates in blood if receptors overloaded (1)</li> </ul>	<p>Do not allow reference to HDL</p> <p>Do not allow if answers also make reference to decreased cholesterol</p> <p>Allow saturated fatty acids</p>	(4)

Q11.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>Correct Plot</p> 	<p>ALLOW any shape in the correct plot area</p> <p>Labelling not required</p>	(1)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Question Number	Answer	Mark
(ii)	<p>The only correct answer is <b>A</b> - bear</p> <p><i>B is not correct because ester bonds are found in lipids and cats have a lower proportion of lipids</i></p> <p><i>C is not correct because ester bonds are found in lipids and humans have a lower proportion of lipids</i></p> <p><i>D is not correct because ester bonds are found in lipids and mice have a lower proportion of lipids</i></p>	(1)

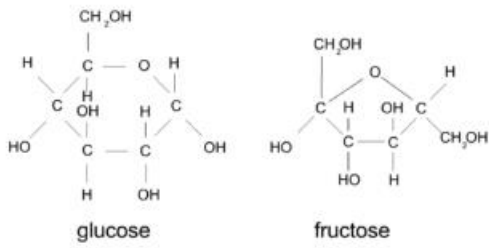
Q12.

Question Number	Answer	Additional Guidance	Mark
(i)	Condensation (1)		(1)

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>B- glycosidic</p> <p><i>A is incorrect because ester bonds are found in lipids</i></p> <p><i>C is incorrect because disaccharides do not contain hydrogen bonds</i></p> <p><i>D is incorrect because peptide bonds are found in proteins</i></p>		(1)

Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q13.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>correct glucose molecule drawn (1)</li> <li>correct fructose molecule drawn (1)</li> </ul>	 <p>glucose                      fructose</p>	(2)

Question Number	Answer	Additional Guidance	Mark
(ii)	Glucose and fructose		(1)



## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q14.

Question Number	Answer	Additional Guidance	Mark
	<p>An answer which makes reference to four of the following:</p> <p><u>Similarities</u></p> <ul style="list-style-type: none"> <li>• both contain carbon, hydrogen and oxygen (1)</li> <li>• both contain glycosidic bonds (1)</li> <li>• both contain glucose (1)</li> </ul> <p><u>Differences</u></p> <ul style="list-style-type: none"> <li>• glycogen contains 1,4 and 1,6-glycosidic bonds whereas disaccharides only contain one type of glycosidic bond (1)</li> <li>• glycogen only contains glucose whereas disaccharides can contain glucose and other monosaccharides (1)</li> </ul>	<p>Answer must contain at least one similarity and one difference</p> <p>ALLOW C,H,O</p> <p>ALLOW named example e.g. lactose contains glucose and galactose ALLOW disaccharide have 2 monosaccharides whereas glycogen have many ALLOW glycogen have only hexose monomers whereas disaccharides can have pentose or hexose monomers</p>	<b>(4)</b>

Q15.

Question Number	Answer	Additional Guidance	Mark
	C - 1,4-glycosidic bonds and 1,6-glycosidic bonds and branched		<b>(1)</b>

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Q16.

Question Number	Answer	Additional guidance	Mark
	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> <li>hydrolysis / description of hydrolysis (1)</li> <li>of glycosidic bonds (1)</li> </ul>		(2)

Q17.

Question Number	Answer	Additional guidance	Mark
	<p>A description that makes reference to two of the following:</p> <ul style="list-style-type: none"> <li>polysaccharide made up of many monosaccharide components (1)</li> <li>joined together by {condensation reactions / glycosidic bonds} (1)</li> <li>(only)1-4 glycosidic bonds present / no 1-6 glycosidic bonds present(1)</li> </ul>	ALLOW chain of glucose molecules	(2)

Q18.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>A description which includes reference to the following:</p> <ul style="list-style-type: none"> <li>joining together in condensation reactions (1)</li> <li>forming {1,4 and 1,6} glycosidic bonds (1)</li> </ul>		(2)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>A description which includes reference to the following:</p> <ul style="list-style-type: none"> <li>branched molecule for more rapid hydrolysis (1)</li> <li>compact so more can be stored (1)</li> </ul>	<p>ALLOW broken down</p> <p>ALLOW 'doesn't take up much space'</p>	(2)

Q19.

Question Number	Answer	Mark
(i)	<p><i>The only correct answer is B which is two</i></p> <p><i>A is not correct because it contains just C, H, O</i></p> <p><i>C is not correct because it contains just C, H, O</i></p> <p><i>D is not correct because it also contains N</i></p>	(1)

Question Number	Answer	Additional Guidance	Mark
(ii)	would contain double bonds between the carbons (in a fatty acid chain) / C=C	ALLOW kink(s) in {fatty acid / hydrocarbon }chain	(1)

Question Number	Answer	Mark
(iii)	<p><i>The only correct answer is D which is an amino acid</i></p> <p><i>A is not correct because it is not an amino acid so not transported by tRNA</i></p> <p><i>B is not correct because it is not an amino acid so not transported by tRNA</i></p> <p><i>C is not correct because it is not an amino acid so not transported by tRNA</i></p>	(1)

## Edexcel Biology A-level - Energy, Carbohydrates and Fats

Question Number	Answer	Mark
(iv)	<p><b>The only correct answer is D which is an amino acid</b></p> <p><b>A</b> is not correct because it is not an amino acid so not joined together by peptide bonds</p> <p><b>B</b> is not correct because it is not an amino acid so not joined together by peptide bonds</p> <p><b>C</b> is not correct because it is not an amino acid so not joined together by peptide bonds</p>	(1)

Question Number	Answer	Mark
(v)	<p><b>The only correct answer is A which is glucose</b></p> <p><b>B</b> is not correct because it is not a glucose molecule so not a component of maltose</p> <p><b>C</b> is not correct because it is not a glucose molecule so not a component of maltose</p> <p><b>D</b> is not correct because it is not a glucose molecule so not a component of maltose</p>	(1)

**Q20.**

Question Number	Answer	Additional Guidance	Mark
(i)	<ul style="list-style-type: none"> <li>correct numbers from table used to calculate increase (1)</li> <li>correct answer (1)</li> </ul>	<p><u>Example of calculation</u> 12886-10090 or 2796</p> <p>(Answer / 10090)*100 = 27.71(%) / 27.7(%) / 28(%)</p> <p>Correct answer without working gains full marks</p>	(2)

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Question Number	Answer	Mark
(ii)	<p>The only correct answer is C - 2223 kcal</p> <p><b>A</b> is not correct because the decimal place is in the wrong place as they have not taken into account converting kJ to joules or calories to kcal.</p> <p><b>B</b> is not correct because the decimal place is in the wrong place as they have not taken into account converting kJ to joules or calories to kcal.</p> <p><b>D</b> is not correct because they have not taken into account converting kJ to joules or calories to kcal.</p>	(1)

Question Number	Answer	Additional Guidance	Mark
(iii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>stored as {glycogen / fat / lipids} (in body cells) (1)</li> </ul>	Answer must be in context of energy	(1)

Q21.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> <li>energy intake higher than energy output (1)</li> <li>(excess) {energy / sugars} can be {stored as / converted to} fat (1)</li> <li>leading to weight gain (greater than overweight) (1)</li> <li>obesity as indicated by a {BMI above 30 / waist-hip ratio greater than 0.85 in women or 1.0 for men} (1)</li> </ul>	<p>ALLOW correct description of energy imbalance</p> <p>ALLOW increase in body mass</p>	(3)