A-Level Edexcel

BIOLOGY

UNIT 1(IAL)

2015 — 2019

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1 - (BI0-S 2015-Unit 1(IAL)-Q1) - *Molecules, Transport and Health*

(a) The release of thromboplastin starts the blood clotting process.

For each of the statements below, put a cross ☒ in the box next to the correct answer.

(i) Thromboplastin is released from

(1)

☒ **A** muscle cells

☒ **B** platelets

☒ **C** red blood cells

☒ **D** white blood cells

(ii) Thromboplastin is a

(1)

☒ **A** carbohydrate

☒ **B** lipid

☒ **C** nucleic acid

☒ **D** protein

(iii) Thromboplastin converts

(1)

☒ **A** fibrin into fibrinogen

☒ **B** fibrinogen into fibrin

☒ **C** prothrombin into thrombin

☒ **D** thrombin into prothrombin

(b) Heparin is a chemical that affects blood clotting time.

The table below shows the effect of heparin concentration on blood clotting time.

Heparin concentration / arbitrary units	Blood clotting time / seconds
0.0	30.1
0.5	30.1
1.0	29.6
1.5	28.8
2.0	27.3
3.0	39.4
4.0	186.8

(i) Using the information in the table, describe the effect of heparin concentration on blood clotting time.

(3)

(ii) Suggest why heparin, at higher concentrations, can be used to treat patients who are at risk of forming blood clots.

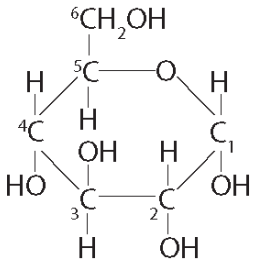
(1)

(iii) Suggest **one** risk of using heparin to treat these patients.

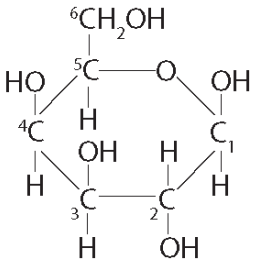
(1)

2 - (BI0-S 2015-Unit 1(IAL)-Q2) **-** *Molecules, Transport and Health*

The diagrams below show the structure of two carbohydrate molecules, α-glucose and galactose.



α-glucose



galactose

(a) Use the information in the diagrams to explain why these two molecules are classed as monosaccharides.

(2)

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(b) Use the information in the diagrams to give **two** differences between a molecule of α-glucose and a molecule of galactose.

(2)

1 .....

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2 .....

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(c) (i) Place a cross ☒ in the box next to the carbohydrate that is formed when a molecule of α-glucose and a molecule of galactose join together.

(1)

- ☒ **A** amylose
- ☒ **B** lactose
- ☒ **C** maltose
- ☒ **D** sucrose

(ii) Describe how these two monosaccharides join to form this carbohydrate.

(3)

(iii) An enzyme is involved in the formation of this carbohydrate. A different enzyme is involved in the formation of a carbohydrate made from two glucose molecules.

Explain why different enzymes are involved in the formation of these different carbohydrates.

(3)

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(d) Give **two** differences between a monosaccharide and a polysaccharide.

(2)

1 .....

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2 .....

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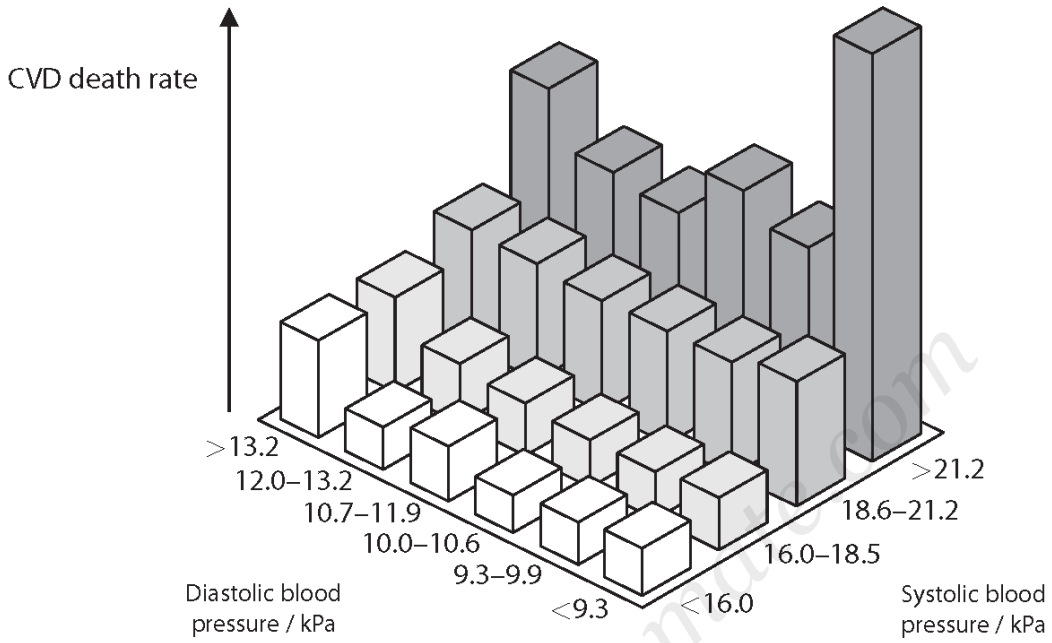
3 - (BI0-S 2015-Unit 1(IAL)-Q4) - *Molecules, Transport and Health*

High blood pressure is a factor that increases the risk of cardiovascular disease (CVD).

The graph below shows the effects of diastolic blood pressure and systolic blood pressure on CVD death rate.



(a) Using the information in the graph, describe the effects of diastolic blood pressure and systolic blood pressure on CVD death rate.

(3)

(b) Explain why high blood pressure increases the risk of CVD.

(3)

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(c) State **two** factors that increase blood pressure.

(2)

1 .....

2 .....

(d) Place a cross ☒ in the box next to the type of drug used to treat high blood pressure.

(1)

☒ **A** anticoagulant

☒ **B** antihypertensive

☒ **C** plant statin

☒ **D** platelet inhibitor

4 - (BI0-S 2015-Unit 1(IAL)-Q7) - *Molecules, Transport and Health*

An investigation was carried out to study the effect of caffeine on heart rate.

Three students were selected for this investigation. The resting heart rate of each student was measured.

The students were then given a caffeine-containing energy drink. The heart rate of each student was measured afterwards.

The results of this investigation are shown in the table below.

Student	Resting heart rate / beats per minute	Heart rate after a caffeine-containing energy drink / beats per minute
1	75	88
2	79	84
3	60	72

(a) Describe how these results could be used to calculate the mean increase in heart rate.

(3)

(b) Describe how the reliability of this investigation could be increased.

(2)

(c) Suggest how this investigation could be improved to confirm that the caffeine caused the increase in heart rate.

Give an explanation for your answer.

(2)

5 - (BI0-W 2015-Unit 1(IAL)-Q2) - *Molecules, Transport and Health*

Lipids such as triglycerides and polysaccharides such as glycogen are energy storage molecules. These molecules can be used during exercise.

(a) Triglycerides are a type of lipid formed when three fatty acid chains combine with a glycerol molecule.

(i) Put a cross ☒ in the box that completes the following statement. Each fatty acid chain is joined to glycerol by

(1)

☒ **A** an ester bond formed by a condensation reaction

☒ **B** an ester bond formed during hydrolysis

☒ **C** a peptide bond formed by a condensation reaction

☒ **D** a peptide bond formed during hydrolysis

(ii) Describe how the structure of a saturated lipid differs from that of an unsaturated lipid.

(2)

(b) Describe the structure of glycogen.

(3)

(c) The table below shows the effect of the intensity of exercise on the percentage of energy obtained from lipids and carbohydrates.

Intensity of exercise / arbitrary units	Percentage of energy obtained (%)	
	From lipids	From carbohydrates
20	60	40
40	50	50
60	30	70
80	20	80
100	0	100

Using the information in the table, describe the effect of the intensity of exercise on the percentage of energy obtained from lipids and carbohydrates.

(3)

6 - (BI0-W 2015-Unit 1(IAL)-Q3) - *Molecules, Transport and Health*

Atherosclerosis is a potentially serious condition that affects millions of people each year. There is a link between saturated fats in the diet and atherosclerosis.

(a) Read through the passage on atherosclerosis, then write on the dotted lines the most appropriate words to complete the passage.

(5)

When atherosclerosis develops, fatty deposits called ..... form.

These deposits cause affected blood vessels called ..... to

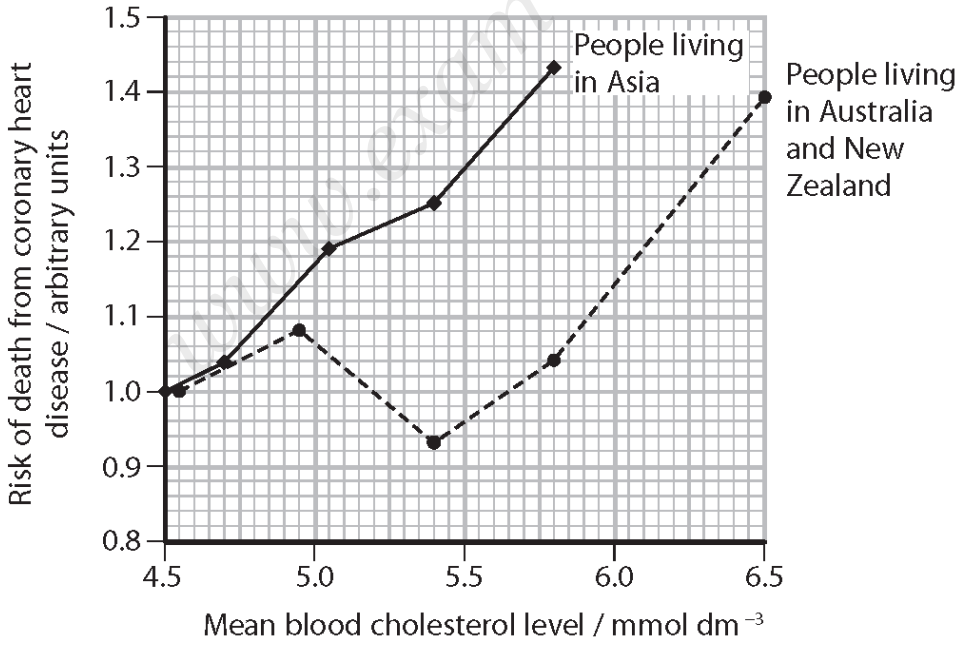
harden and ....., reducing the supply of .....

to the tissues. This can cause a heart attack or, if the .....

is affected, it can cause a stroke.

(b) It has been suggested that high blood cholesterol levels can cause cardiovascular disease (CVD). Coronary heart disease is one type of CVD.

The graph below shows the relationship between mean blood cholesterol level and the risk of death from coronary heart disease in two groups of people.



(i) Describe the relationship between blood cholesterol level and the risk of death from coronary heart disease for people living in Asia.

(1)

(ii) Describe how this relationship differs from that shown for people living in Australia and New Zealand.

(2)

(iii) Suggest **one** explanation for the difference in the relationship for these two groups of people.

(1)

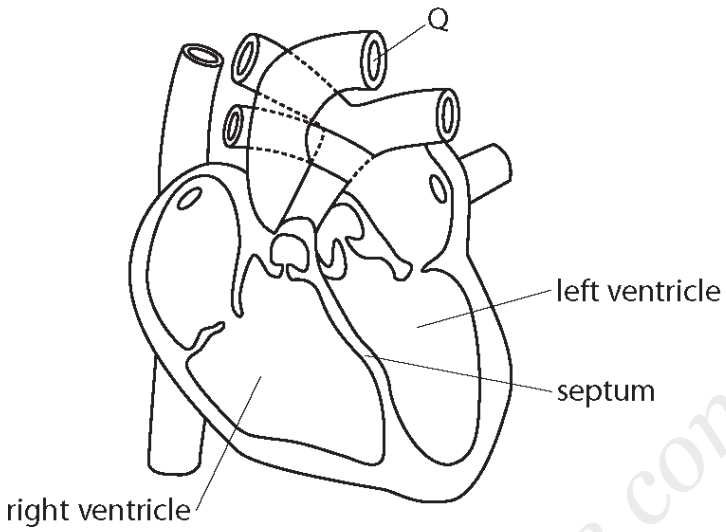
(iv) Suggest how the information in the graph could be used to improve the health of people living in Asia.

(1)

7 - (BI0-W 2015-Unit 1(IAL)-Q7) - *Molecules, Transport and Health*

The heart is part of the mammalian circulatory system.

The diagram below shows a section through the human heart.



(a) Put a cross ☒ in the box that completes the following statement.
The blood vessel labelled Q in the diagram is the

(1)

- ☒ **A** aorta
- ☒ **B** coronary artery
- ☒ **C** pulmonary vein
- ☒ **D** vena cava

(b) Explain how the structure of a capillary is related to its function.

(2)

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*(c) Describe the role of the heart valves in the cardiac cycle.

(6)

(d) A small number of babies are born with a hole in the septum that separates the left and right ventricles. If the hole is not repaired these babies may not survive.

Suggest why these babies may not survive.

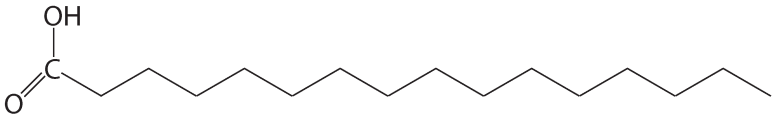
(2)

8 - (BI0-S 2016-Unit 1(IAL)-Q1) - *Molecules, Transport and Health*

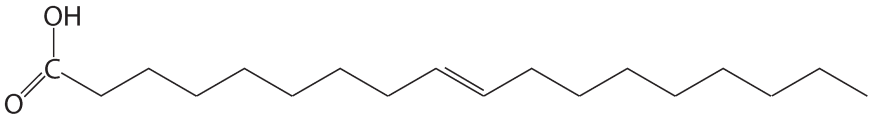
Triglycerides are synthesised from glycerol and fatty acids.

(a) The diagrams below show the structures of three fatty acids and their melting temperatures.

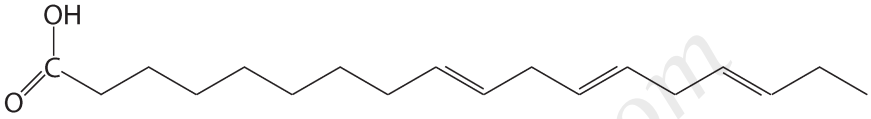
palmitic acid 63 °C



oleic acid 14 °C



linolenic acid –5 °C



(i) Using the diagrams above, describe the structure of oleic acid.

(2)

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(ii) Using the information in the diagrams, explain why these fatty acids have different melting temperatures.

(3)

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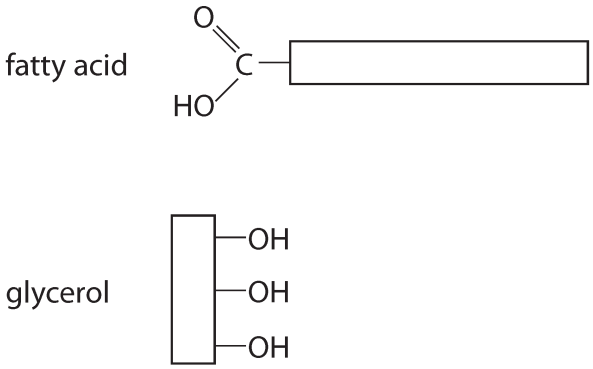
(b) The diagrams below show the simplified structures of a fatty acid molecule and a glycerol molecule.



(i) Use these diagrams to show the products formed from a reaction between **one** fatty acid molecule and the glycerol molecule.

(2)

(ii) Name this type of reaction.

(1)

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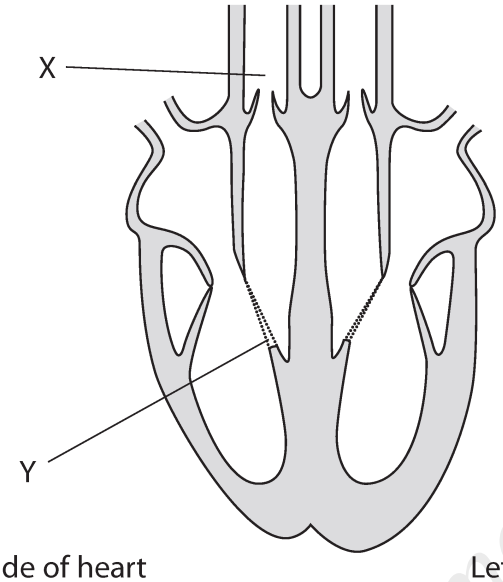
9 - (BI0-S 2016-Unit 1(IAL)-Q2) - *Molecules, Transport and Health*

The diagram below shows a section of a human heart and its blood vessels.

(a) On the diagram, draw arrows to show the flow of blood through the left side of the heart.



(1)

(b) Put a cross ☒ in the box that completes each of the following statements.

(i) The blood vessel labelled X carries

(1)

- ☒ **A** blood low in oxygen to the heart
- ☒ **B** blood low in oxygen from the heart
- ☒ **C** oxygen rich blood from the heart
- ☒ **D** oxygen rich blood to the heart

(ii) The structure labelled Y

(1)

- ☒ **A** pulls the semilunar valve open
- ☒ **B** pushes the atrioventricular valve closed
- ☒ **C** stops blood flowing from the ventricle to blood vessel X
- ☒ **D** stops the atrioventricular valve opening the wrong way

(c) In mammals, blood passes through the heart twice for each circulation of the body.

Suggest how this type of circulation enables mammals to carry out effective gas exchange.

(3)

10 - (BI0-S 2016-Unit 1(IAL)-Q3) - *Molecules, Transport and Health*

Carbohydrates, such as starch and lactose, are important energy sources.

(a) Starch contains amylose and amylopectin.

(i) Compare the structures of amylose and amylopectin.

(3)

(ii) Explain how the structure of amylopectin affects its ability to provide energy.

(2)

(b) Milk contains between 2% and 8% lactose by weight.

State **one** difference between the structure of lactose and the structure of starch.

(1)

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(c) In one study, carried out in Sweden, the mass of milk in the diet and the relative risk of death were investigated.

Mass of milk in diet /grams per day	Relative risk of death	
	male	female
0	1.00	1.00
200	1.15	1.03
400	1.32	1.06
600	1.52	1.09
800	1.75	1.13
1000	2.01	1.16
1200	2.31	1.19

(i) State the relationship between the mass of milk in the diet and the relative risk of death.

(1)

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(ii) Suggest an explanation for this relationship.

(2)

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(iii) A newspaper report claimed this study proved that drinking large quantities of milk increased the risk of death.

Suggest why this claim may not be true.

(1)

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