

Write your name here	
Surname	Other names
Centre Number	Candidate Number
<input type="text"/>	<input type="text"/>
Edexcel GCE	
Biology	
Advanced Subsidiary	
Unit 1: Lifestyle, Transport, Genes and Health	
New Template Exemplar Time: 1 hour 15 minutes	Paper Reference 6BI01/01
You do not need any other materials.	Total Marks
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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, including your use of grammar, punctuation and spelling.
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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Turn over ►

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Answer ALL questions.

Some questions must be answered with a cross \boxtimes . If you change your mind about an answer, put a line through the box \boxtimes and then mark your new answer with a cross \boxtimes .

1 Carbohydrates are compounds that include monosaccharides, disaccharides and polysaccharides.

- (a) (i) The table below lists some features of four carbohydrates.
Put a cross \boxtimes to indicate that the feature is present in the carbohydrate.
The first row has been done for you.

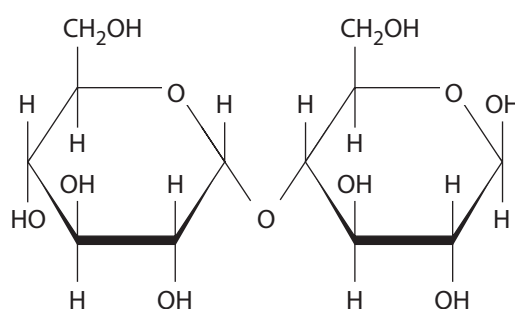
(4)

Feature	Glucose	Glycogen	Maltose	Starch
1–4 glycosidic bonds present	\boxtimes	\boxtimes	\boxtimes	\boxtimes
1–6 glycosidic bonds present	\boxtimes	\boxtimes	\boxtimes	\boxtimes
Made up of many monomers	\boxtimes	\boxtimes	\boxtimes	\boxtimes

- (ii) Name the disaccharide made up of α -glucose and galactose.

(1)

- (iii) The diagram below shows a disaccharide molecule.



Draw the molecules resulting when this disaccharide molecule is split into its two component monosaccharides.

(2)



(iv) Name this type of reaction.

(1)

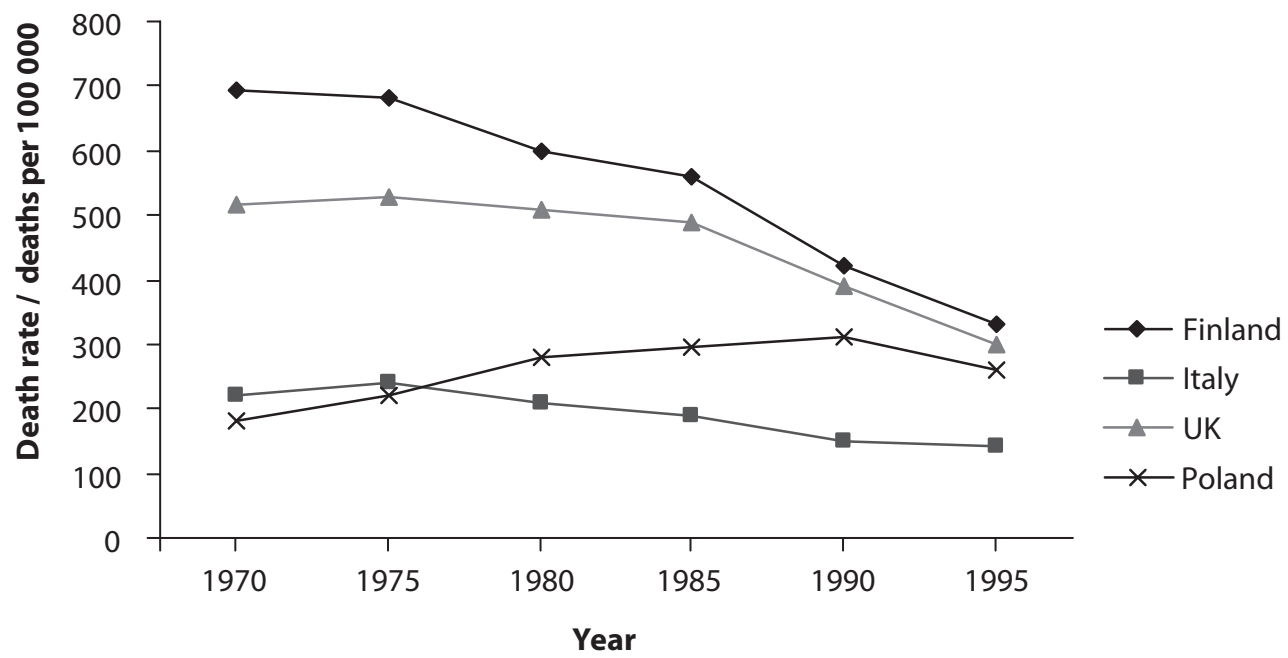
(b) Explain the advantages of glycogen as an energy storage molecule in the human body.

(3)

(Total for Question 1 = 11 marks)



2 The graph below shows death rates from coronary heart disease (CHD) in men from 1970 to 1995 in four countries.



(a) Describe the changes in death rates shown on the graph.

(3)

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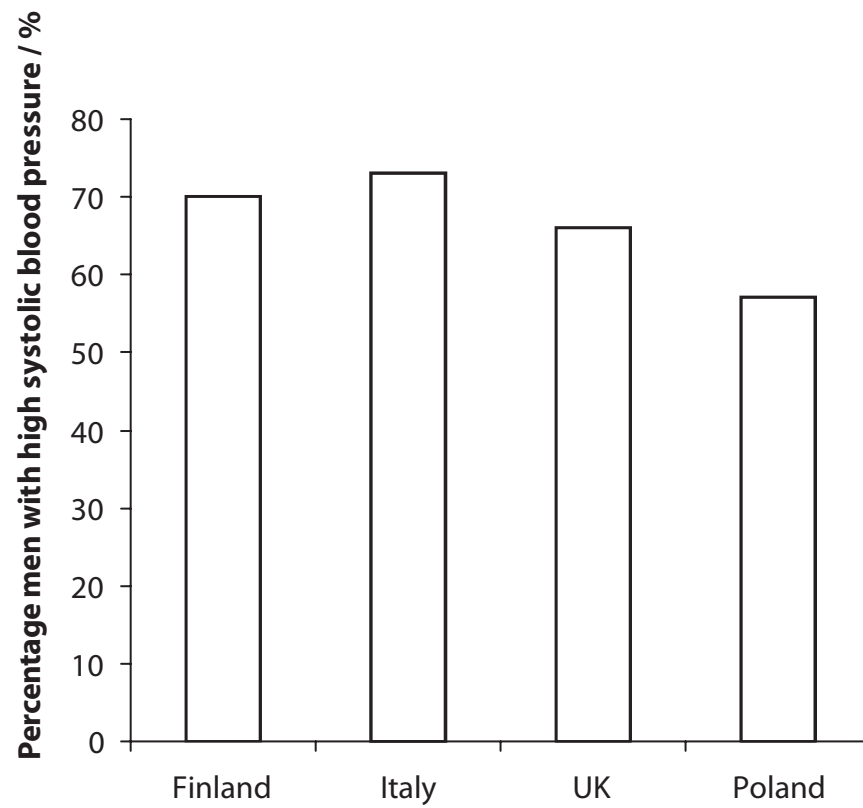
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(b) The graph below shows the percentage of men from these countries **in 1980** with high systolic blood pressure.



It has been suggested that there is a link between high blood pressure and deaths from CHD.

(i) Using both graphs, give **two** pieces of evidence to support this hypothesis.

(2)

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(ii) Suggest why the data shown in the graphs do not fully support the hypothesis.

(2)

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(c) Suggest how high blood pressure can result in less oxygen reaching heart muscle. (3)

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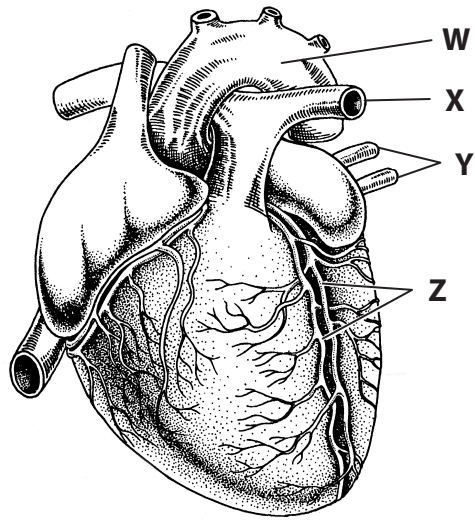
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(Total for Question 2 = 10 marks)



3 The diagram below shows an external view of the heart.



(a) Name the blood vessels labelled **W**, **X**, **Y** and **Z**.

(2)

W

X

Y

Z

(b) Describe and explain the events that occur during ventricular systole in the cardiac cycle.

(4)

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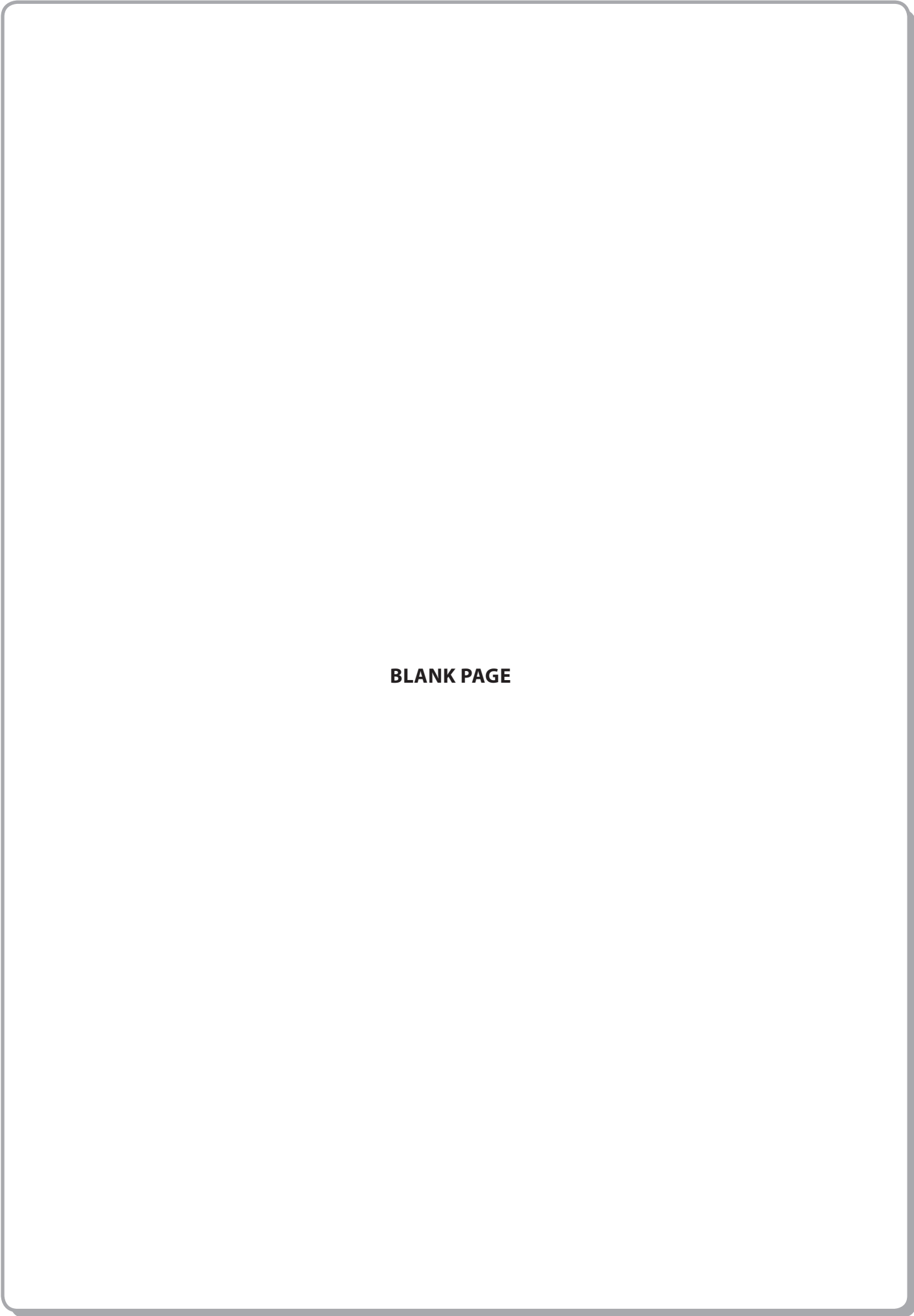
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- 4 (a) Blood vessels can be distinguished by their structure. The table shows some structural features for three blood vessels **P**, **Q** and **R**.

Structural feature	P	Q	R
Endothelium present	✓	✓	✓
Small lumen relative to the thickness of the walls	✓	✗	✗
Many elastic fibres present	✓	✗	✗
Valves present	✓	✓	✗

Identify the blood vessels **P**, **Q** and **R**.

(3)

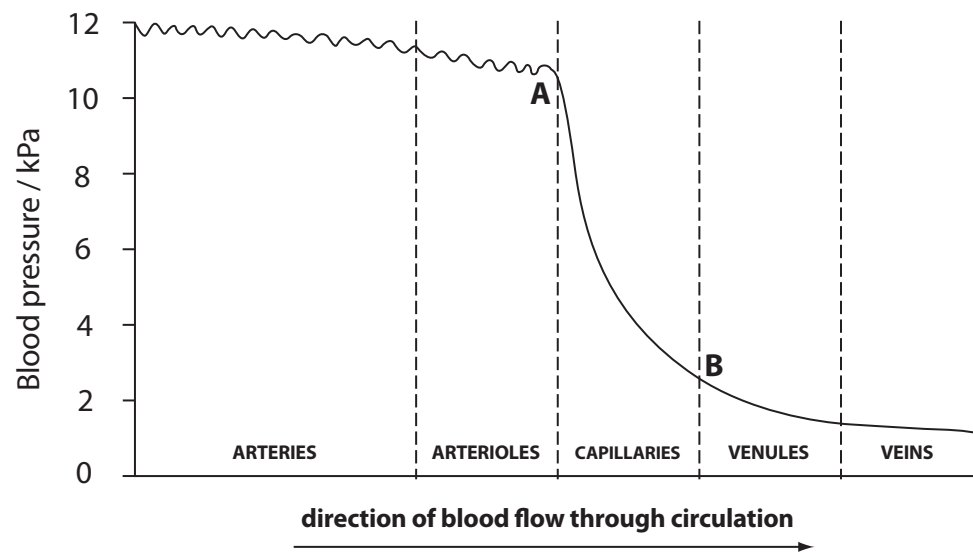
P

Q

R



(b) The diagram below shows changes in blood pressure as blood flows from the arteries to the veins.



The blood pressure at point A is 10.5 kPa and the blood pressure at point B is 2.5 kPa. Calculate the percentage decrease in the pressure as blood flows from A to B.

(2)

Answer kPa

(c) Explain the changes in blood pressure

(2)

(i) in the arteries

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(ii) in the capillaries.

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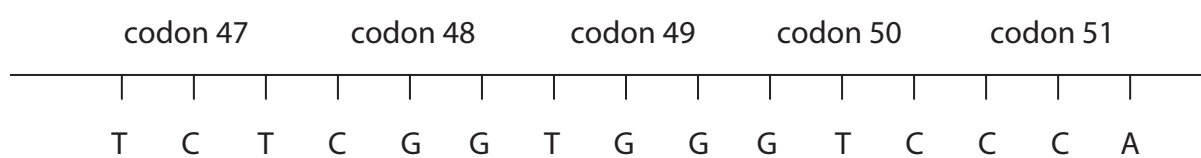
(Total for Question 4 = 7 marks)



- 5 Amino acids are coded for by one or more DNA triplet codons. The table below shows some amino acids found in human proteins and their corresponding DNA triplet codons. A DNA triplet codon for the stop signal is also shown.

Amino acid	Triplet codons
Threonine	TGA TGG TGT
Glutamine	GTT GTC
Glycine	CCA CCG CCT CCC
Arginine	TCT
Alanine	CGG CGC
Stop signal	ACT

The diagram below shows part of a DNA molecule. This part of the DNA molecule is located near the end of a gene.



- (a) Give the sequence of amino acids found in the polypeptide chain that is coded for by this part of the DNA strand. (2)

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- (b) Give the next triplet codon that you would expect to see on this DNA strand if codon 51 coded for the last amino acid in the polypeptide chain. (1)

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(c) Complete the diagram below to show the sequence of bases on a molecule of messenger RNA synthesised from this part of the DNA strand.

(2)



(d) Mutations can occur during DNA replication.

(i) Suggest what would happen to the structure of the protein coded for by this DNA molecule if thymine in **codon 49** were replaced by cytosine.

(2)

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(ii) Suggest what would happen to the structure of the protein coded for by this DNA molecule if adenine replaced the first thymine in **codon 47**.

(2)

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(Total for Question 5 = 9 marks)



- 6 (a) The table below refers to three transport mechanisms. If the statement is true, put a cross in the appropriate box.

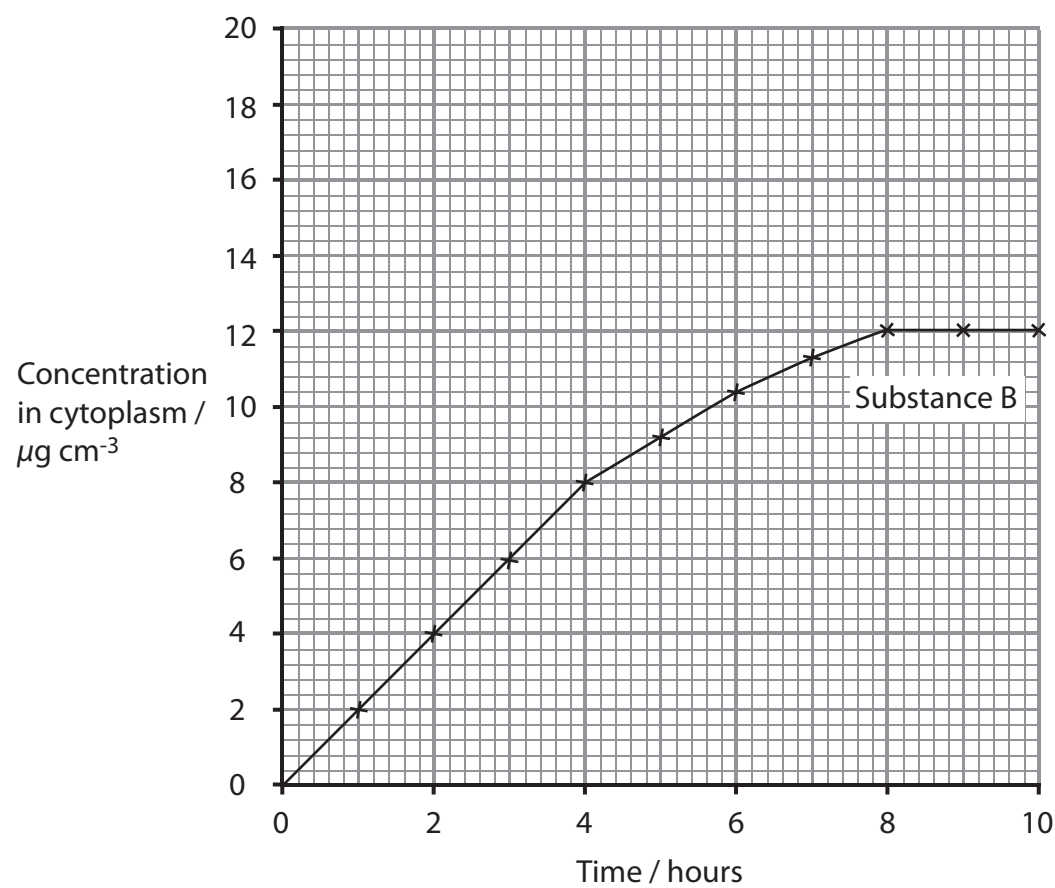
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Statement	Osmosis	Facilitated diffusion	Active transport
Movement of water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Requires ATP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Molecules move down their concentration gradient	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Carrier proteins are needed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- (b) An experiment was carried out to measure the uptake of substance B by some red blood cells.

The red blood cells were placed in a solution containing substance B and kept at 25 °C. The concentration of substance B in the cytoplasm of the cells was measured every hour over a period of 10 hours.

The results of this experiment are shown in the graph below.



(i) Describe the changes in cytoplasm concentration of substance B shown in the graph and explain how these changes support the statement that substance B enters the cells by diffusion.

(4)

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(ii) Suggest how the shape of the graph would change if the temperature in the experiment was decreased to 10 °C. Give an explanation for your answer.

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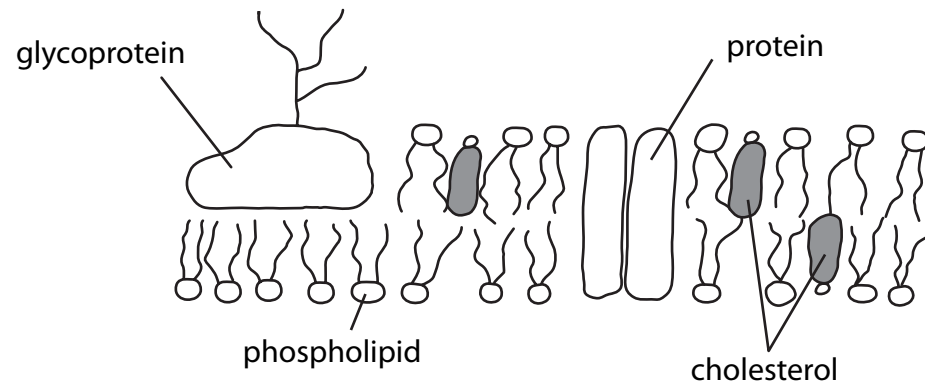
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(Total for Question 6 = 12 marks)



7 The diagram below shows a model of the structure of the cell surface (plasma) membrane.



(a) Explain why the model used to describe the structure of this cell membrane is called the fluid mosaic model.

(2)

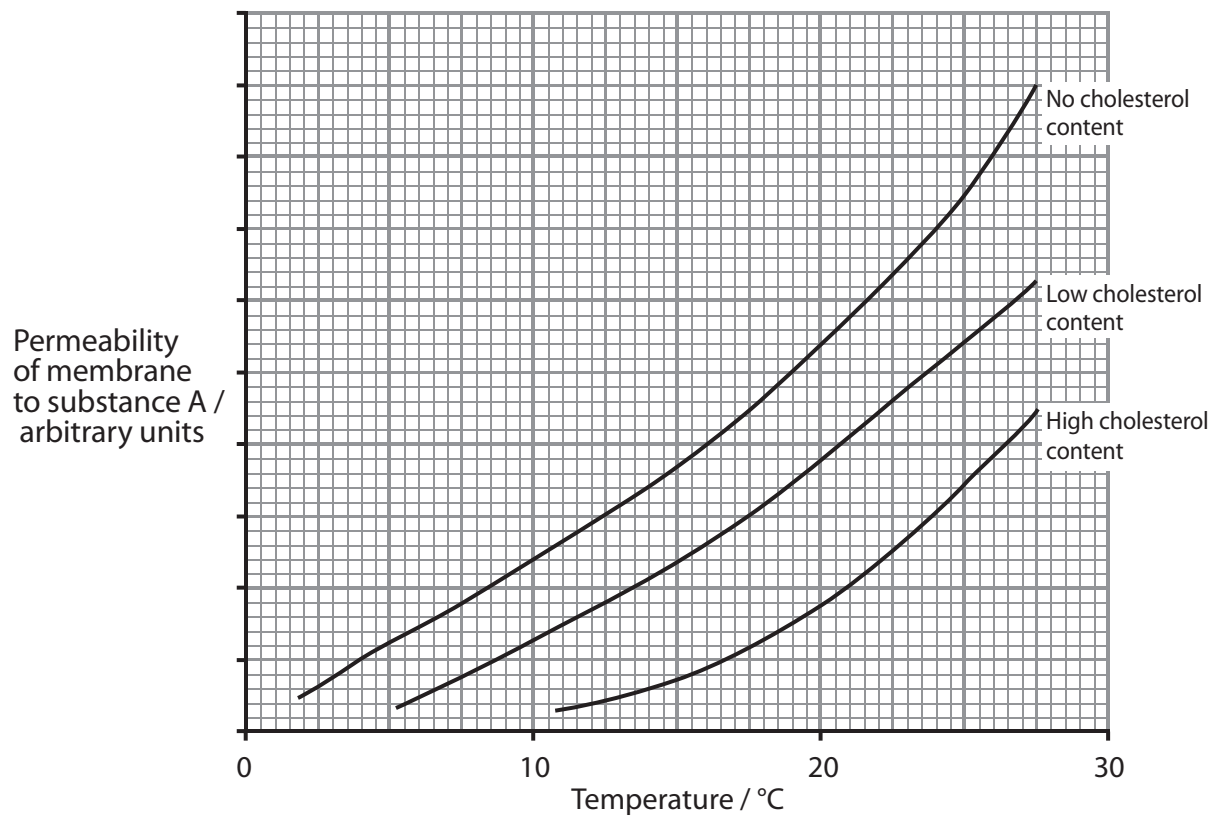
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(b) The graph below shows how the permeability of three different membranes to substance A changes with temperature. One of the membranes contains no cholesterol, one of the membranes has a low cholesterol content and the third membrane has a high cholesterol content.



(i) Describe the effects of the presence of cholesterol and of an increase in temperature on the permeability of the three membranes to substance A.

(3)

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(ii) When cholesterol is present it binds weakly to the phospholipids in the membrane.

Substance A moves across the membrane between the phospholipid molecules.

Suggest an explanation for the effect cholesterol has on the permeability of the membranes to substance A.

(2)

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(Total for Question 7 = 7 marks)



8. The rate of diffusion of gases across an exchange surface is greatest if the surface is thin and a concentration gradient is maintained across it.

(a) Describe how each of these factors is involved in efficient gas exchange in the alveoli of a mammalian lung.

(3)

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(b) Describe and explain the effect of cystic fibrosis on gas exchange.

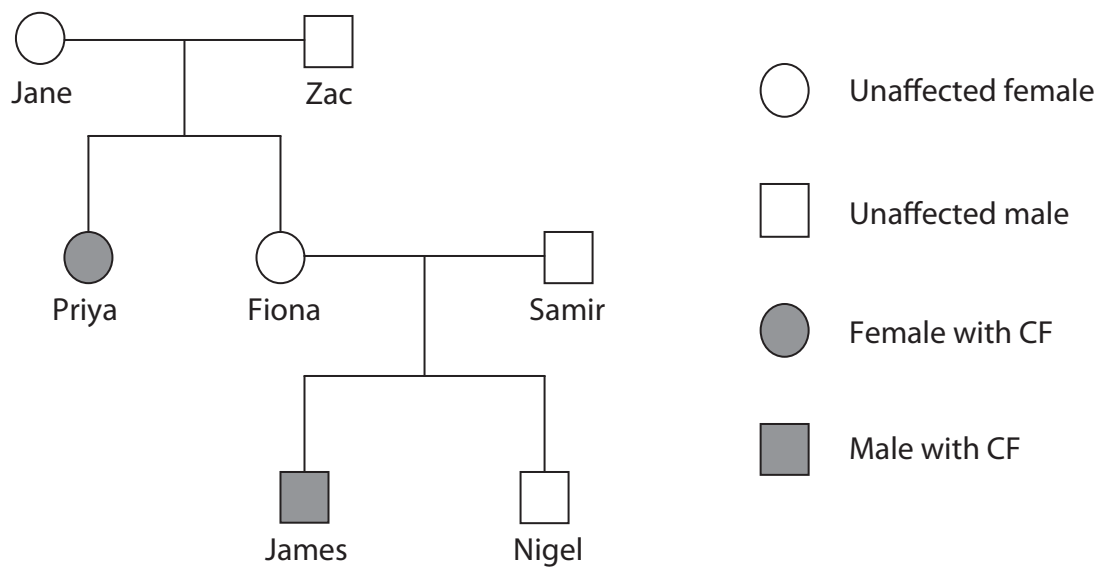
(2)

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(c) The pedigree below shows the inheritance of cystic fibrosis (CF) in one family.



With reference to the information in the pedigree, answer the following questions.

(i) Give the name of a female who is homozygous for the CF gene. (1)

(ii) Give the name of a male who is heterozygous for the CF gene. (1)

(iii) If Fiona and Samir had a third child, state the probability that this child would have cystic fibrosis. (1)

(d) Genetic screening can be used to identify the cystic fibrosis allele. By considering contrasting ethical viewpoints, discuss **one** reason in favour and **one** reason against genetic screening for cystic fibrosis. (4)

(Total for Question 8 = 12 marks)

TOTAL FOR PAPER = 80 MARKS



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