Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	B	I	0	1	/	1	Signature	

Paper Reference(s)

6BI01/1

Edexcel GCE

Biology

Unit 1: Lifestyle, Transport, Genes & Health

Specimen Assessment Material

Time: 1 hour 15 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
Do not use pencil. Use blue or black ink.
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (~~☒~~) and then mark your new answer with a cross (☒).

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 8 questions in this question paper. The total mark for this paper is 80.
There are 20 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

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.
Answers should be given in a correct biological context.

Printer's Log. No.
N32916A
W850/XXXX/57570 2/2

N 3 2 9 1 6 A 0 1 2 0

Turn over

edexcel
advancing learning, changing lives

Leave blank

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

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

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

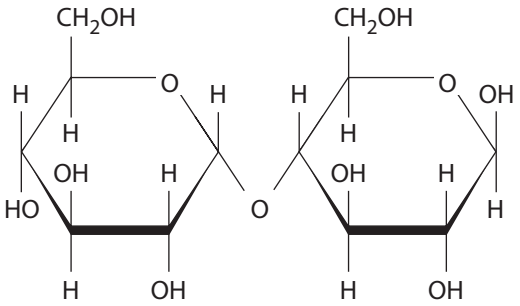
(4)

(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)

Leave blank

(iv) Name this type of reaction.

.....

(1)

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

.....

.....

.....

.....

.....

.....

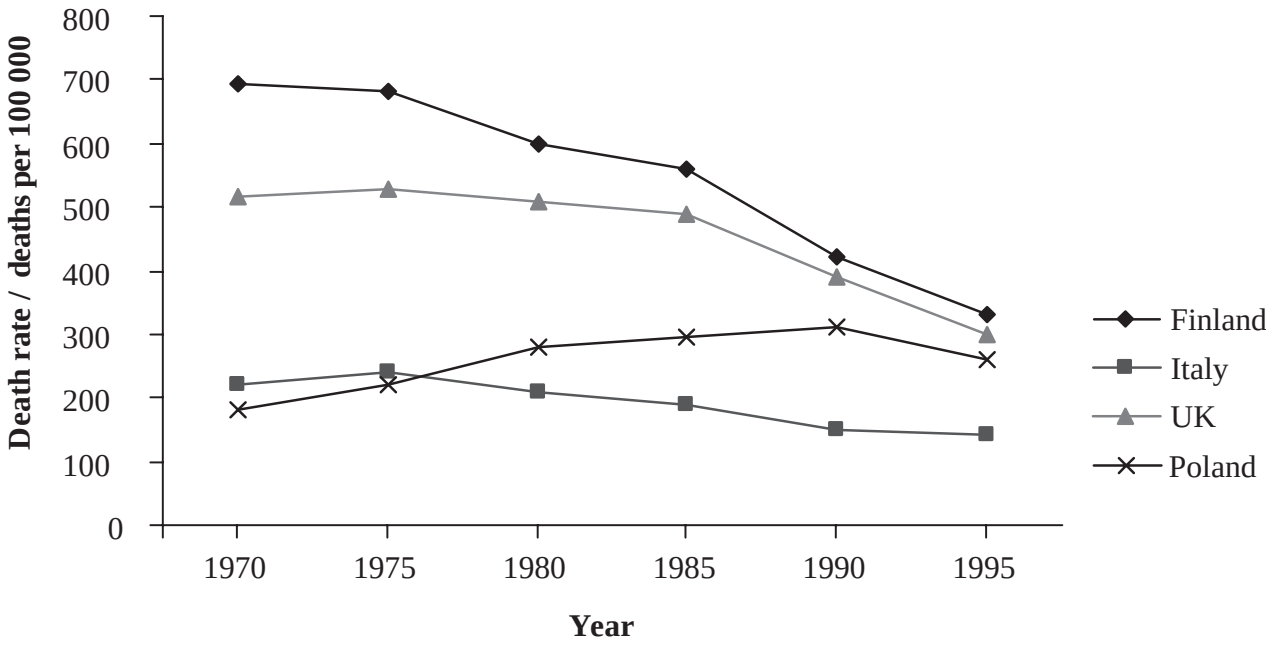
(3)

Q1

(Total 11 marks)

Leave blank

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.

.....

.....

.....

.....

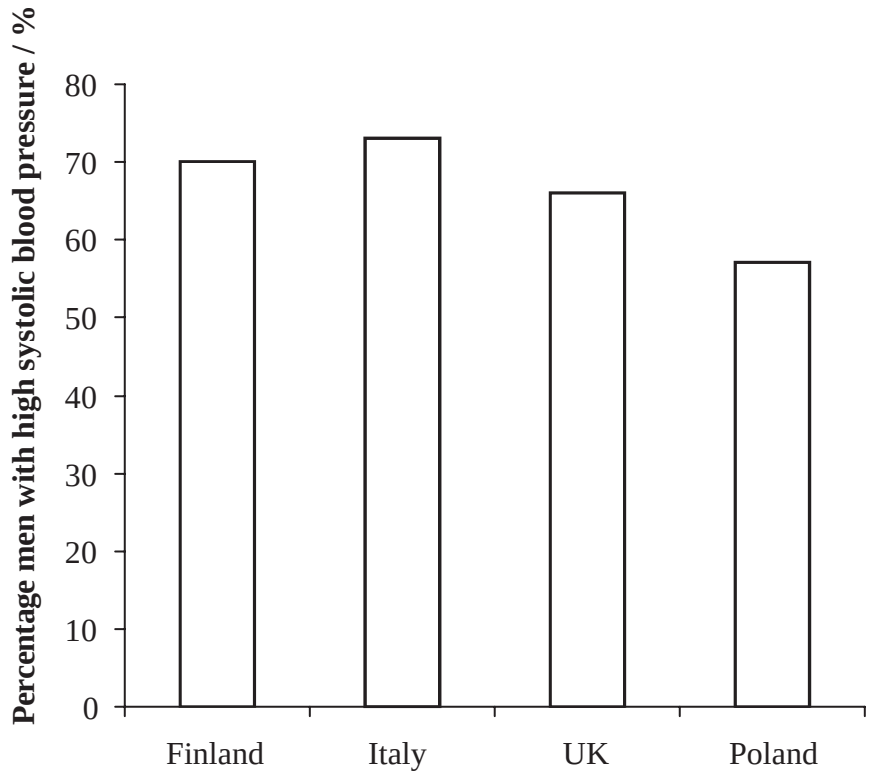
.....

.....

(3)

Leave blank

(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)

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

.....

.....

.....

.....

(2)

Leave blank

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

.....

.....

.....

.....

.....

.....

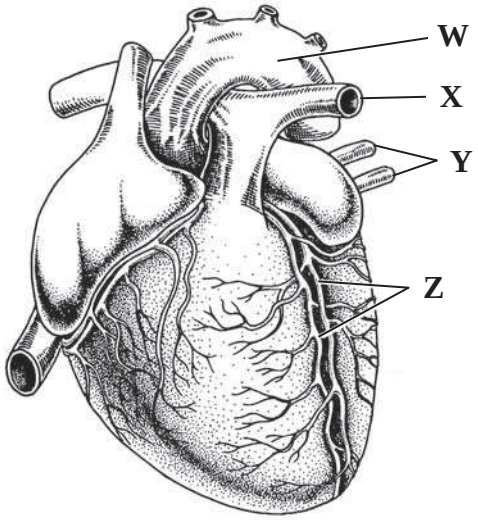
(3)

Q2

(Total 10 marks)

Leave blank

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



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

W .....

X .....

Y .....

Z .....

(2)

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

.....

.....

.....

.....

.....

.....

.....

.....

(4)

Leave blank

(c) The hypothesis that higher concentrations of caffeine will increase heart rate can be investigated practically using *Daphnia* (water fleas).

Describe a reliable procedure that could be used to test this hypothesis.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(6)

Q3

(Total 12 marks)

BLANK PAGE

Leave blank

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**.

P .....

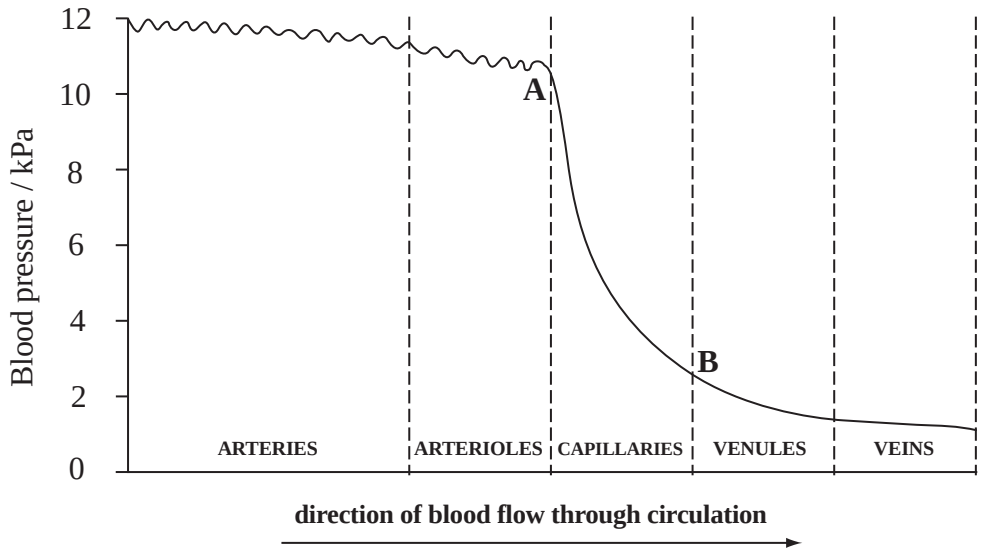
Q .....

R .....

(3)

Leave blank

(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.

Answer ..... kPa
(2)

(c) Explain the changes in blood pressure

(i) in the arteries

.....

.....

(ii) in the capillaries.

.....

.....
(2)

Q4

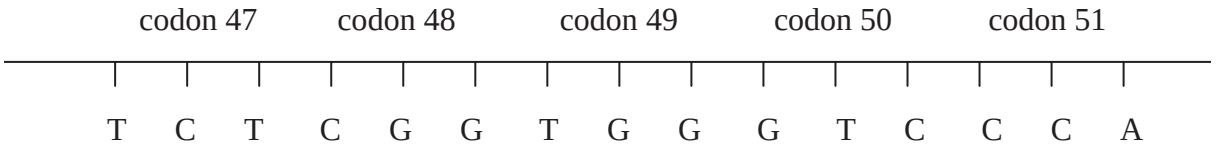
(Total 7 marks)

Leave blank

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)

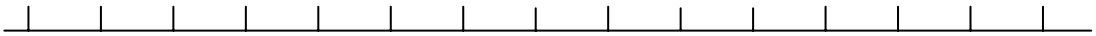
(b) Give the next triplet codon that you would expect to see on this DNA strand if codon 51 coded for the last amino acid in the polypeptide chain.

.....

(1)

Leave blank

(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)

(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)

Q5

(Total 9 marks)

Leave blank

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

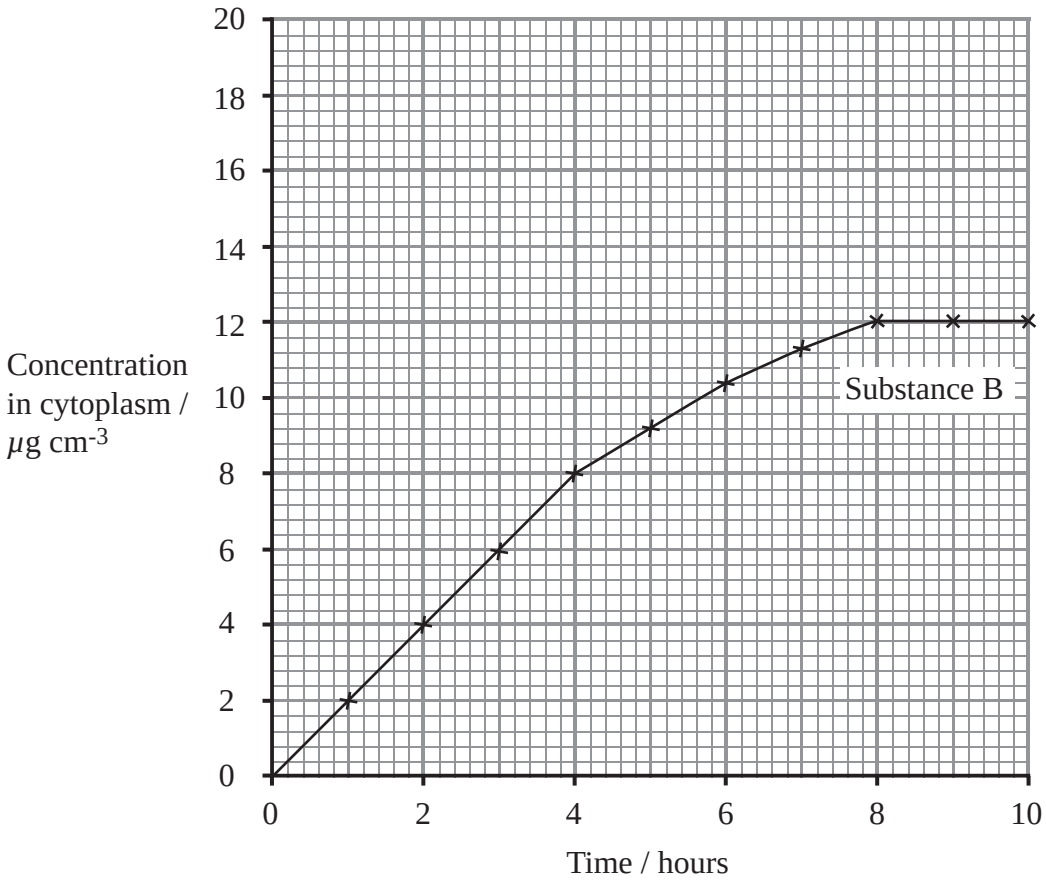
Statement	Osmosis	Facilitated diffusion	Active transport
Movement of water	☒	☒	☒
Requires ATP	☒	☒	☒
Molecules move down their concentration gradient	☒	☒	☒
Carrier proteins are needed	☒	☒	☒

(6)

(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.



Leave blank

(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)

(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.

.....

.....

.....

.....

.....

.....

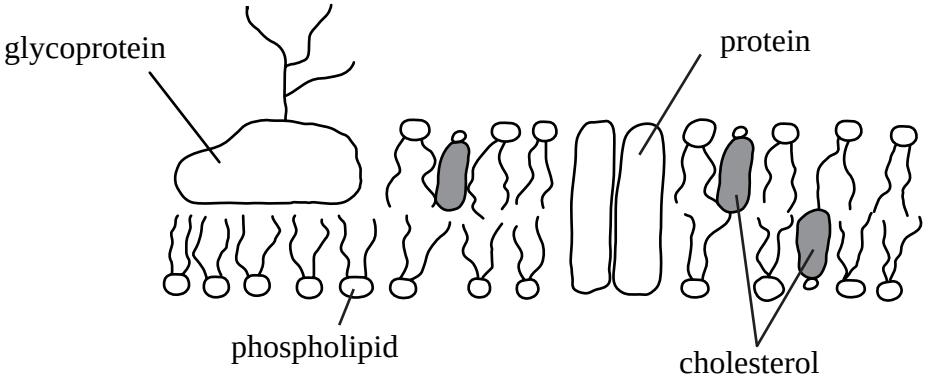
(2)

Q6

(Total 12 marks)

Leave blank

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.

.....

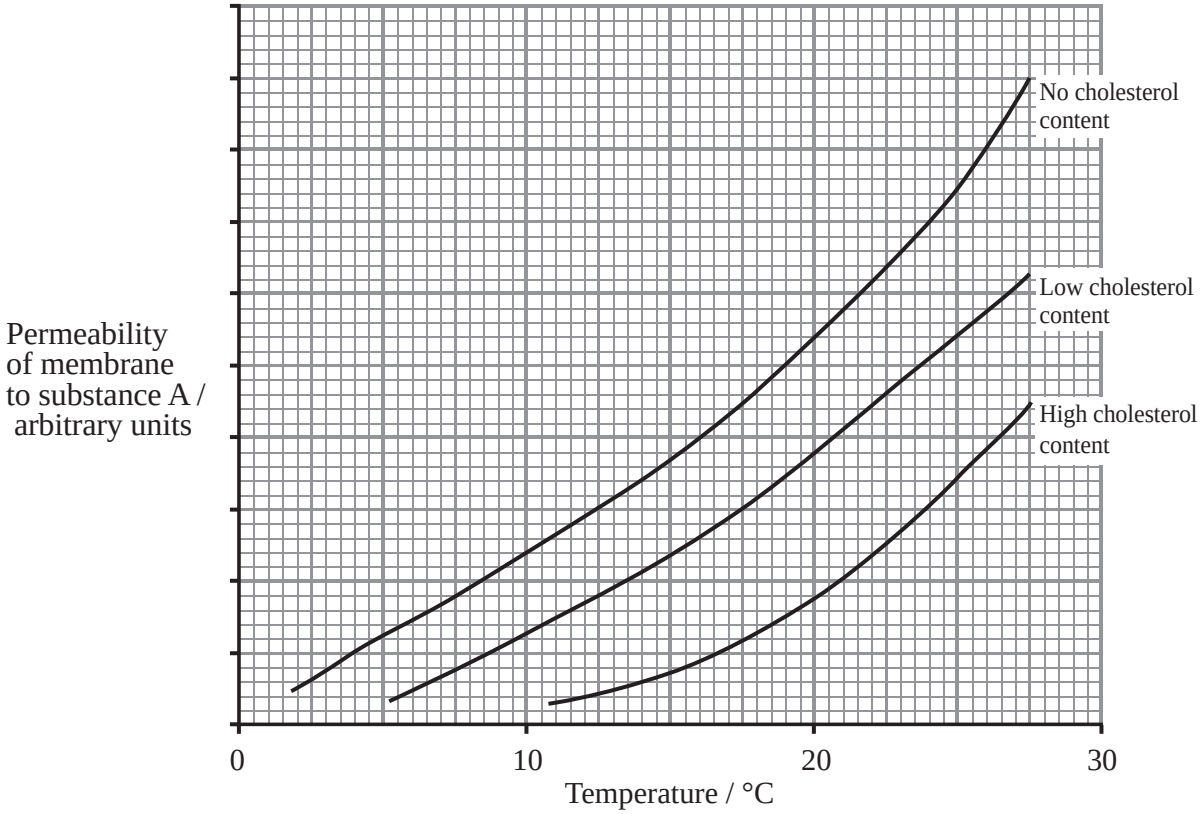
.....

.....

.....

(2)

(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.



Leave blank

(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)

(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)

Q7

(Total 7 marks)

Leave blank

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)

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

.....

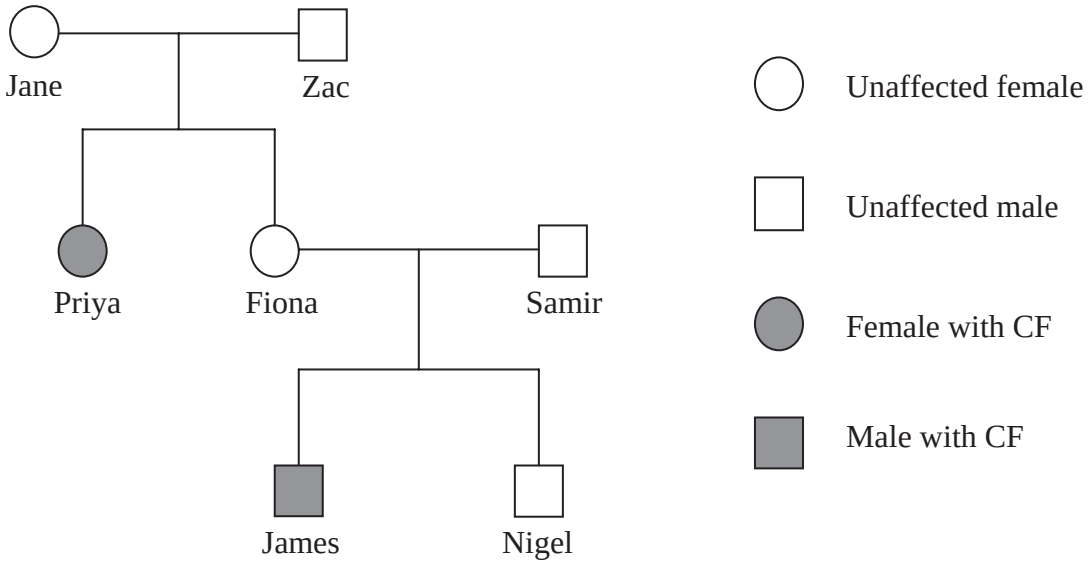
.....

.....

.....

(2)

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



Leave blank

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)

Q8

(Total 12 marks)

TOTAL FOR PAPER: 80 MARKS

END