WJEC CBAC

New GCSE

4461/01

SCIENCE A
FOUNDATION TIER
BIOLOGY 1

A.M. THURSDAY, 12 January 2012

1 hour

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	6	
2	5	
3	3	
4	13	
5	4	
6	5	
7	8	
8	6	
9	4	
10	6	
Total	60	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication used in your answer to question 8.

Answer **all** *questions.*

1. The diagram shows a woodland food chain (not drawn to scale). Bacteria, that bring about decay, are found in the soil.
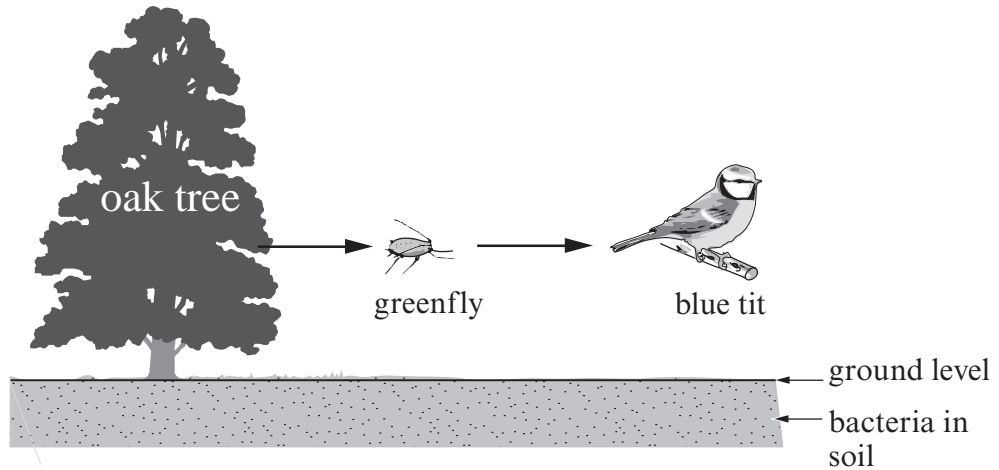
(a) (i) What is the source of energy for the food chain? [1]

....

(ii) Name the herbivore in this food chain. [1]

....

(b) Using this food chain, complete the labels on the pyramid of biomass below. [1]
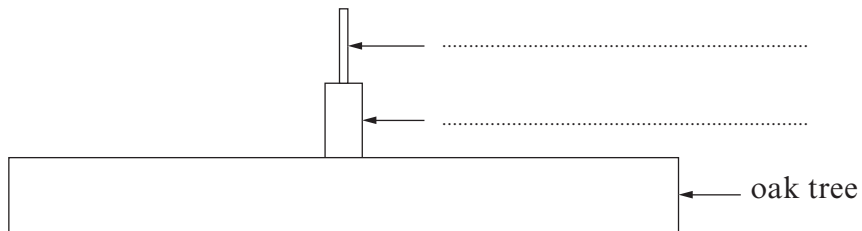
(c) The organisms in the food chain belong to different groups. Each group has an identifying feature.
Use information in the table to place each organism into it's correct group.

Place a tick (✓) in the correct group. One has been done for you. [3]

Organism	Feature	Group			
		plant	vertebrate	invertebrate	microorganism
Oak tree	has flowers	✓			
Greenfly	has no backbone				
Blue tit	has backbone				
Bacteria	bring about decay				

Turn over.

6

2. The diagram shows some features of the Carbon Cycle. The features are labelled **A** to **D**.
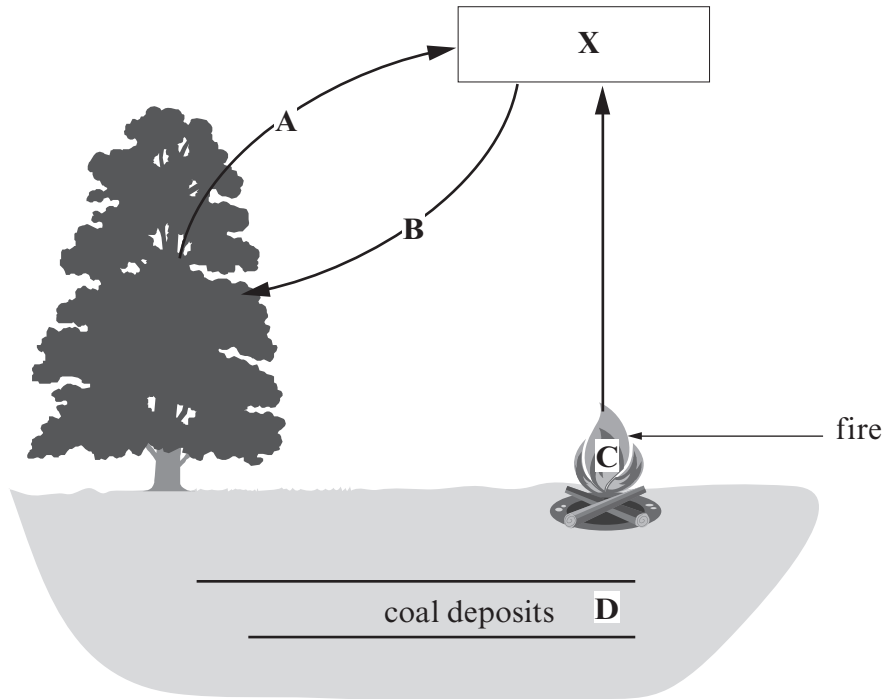
(a) The list shows some of the features in the diagram.
Write the correct letter from the diagram in the space by each feature. [3]

Feature	Letter
combustion	....
respiration	....
a store of carbon	....

(b) State the name of the gas at **X**. [1]

....

(c) State the name of the process at **B**. [1]

....

3. The chart below lists four sense organs and four stimuli.
Draw a straight line from each sense organ to the stimulus it detects. [3]

Sense organ   **stimulus**

| eye |

| ear |

| skin |

| tongue |

| chemicals |

| sound |

| touch |

| light |

Turn over.

4. In an experiment, Sue measured her skin temperature while sitting outside on a hot day.

The results are shown in the table.

	Time sitting outside (minutes)					
	0	2	4	6	8	10
Skin temperature (°C)	24	34	35	38	38	38

(a) (i) Complete a line graph of these results on the grid by:

    I   choosing the scale on the time axis, [1]

    II plotting the points, [2]

    III joining the plots with a ruler. [1]

Skin
temperature
(°C)

Time sitting outside (minutes)
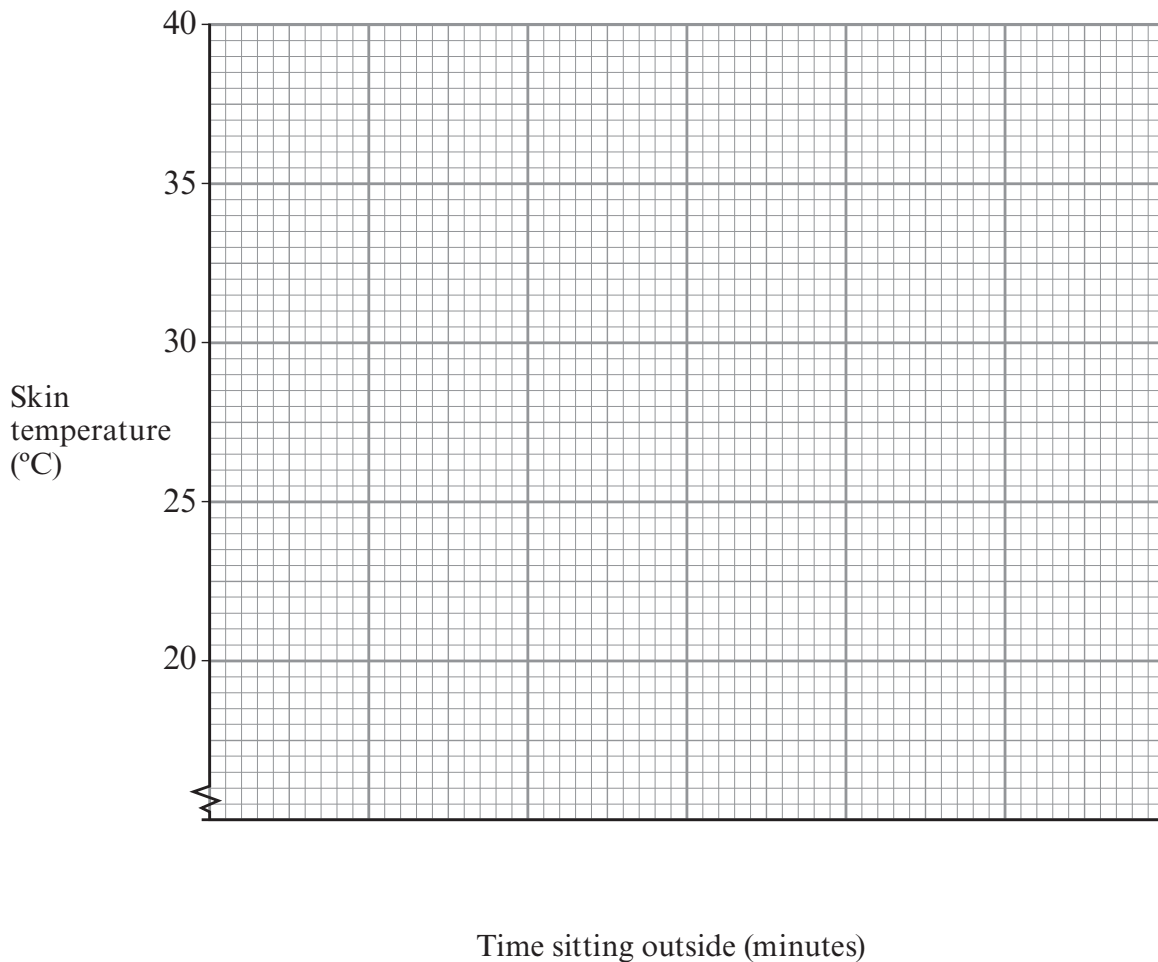
(ii) From the graph, describe how the skin temperature changed during the experiment.
[1]

....

....

(b) The diagram shows a section through the skin.
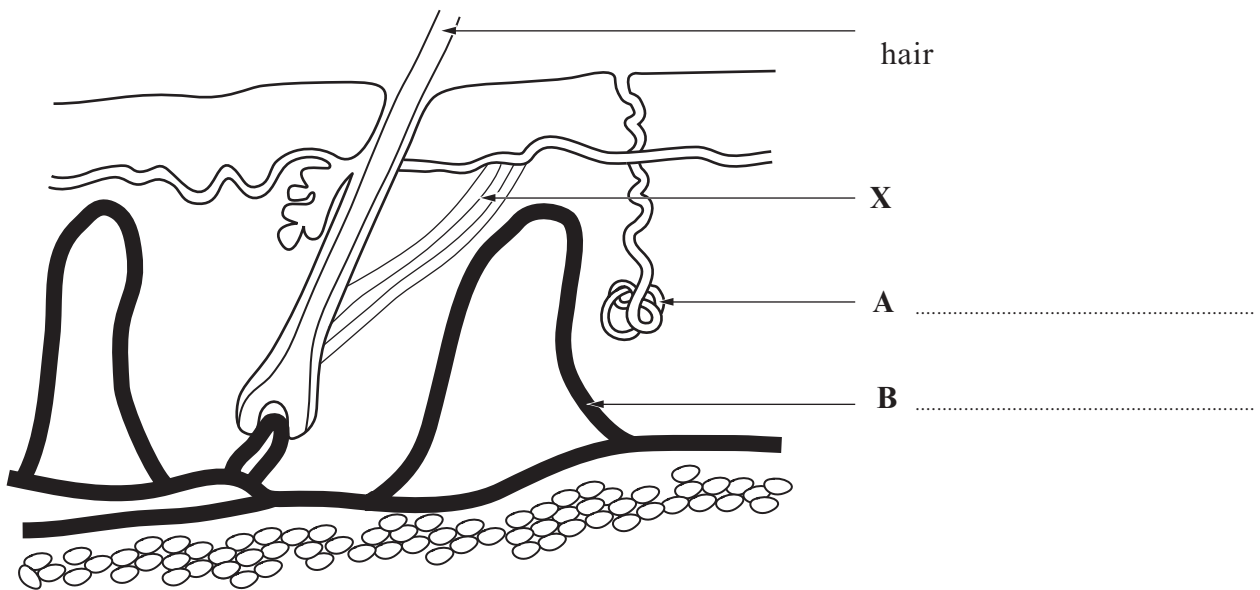
(i) Using the list below, label **A** and **B** on the diagram. [2]

blood vessel   nerve   sweat gland   sweat pore

(ii) Complete the following sentence using the correct word from the list. [1]

absorption   evaporation   insulation

When we sweat, heat is lost from the skin by ....

(iii) Complete the table below to show how the skin responds in **cold** conditions.

Circle the correct answer for each feature.

Feature of skin	Response
sweat from sweat gland	more / less / stays the same
blood flow in vessels near surface	more / less / stays the same

[2]

(iv) Structure **X** on the diagram can contract and relax.

I   Name **X** .... [1]

II   Describe how **X** and the hair work together to keep us warm. [2]

....

....

....

Turn over.

5. The graph shows variation in the height of wheat plants.
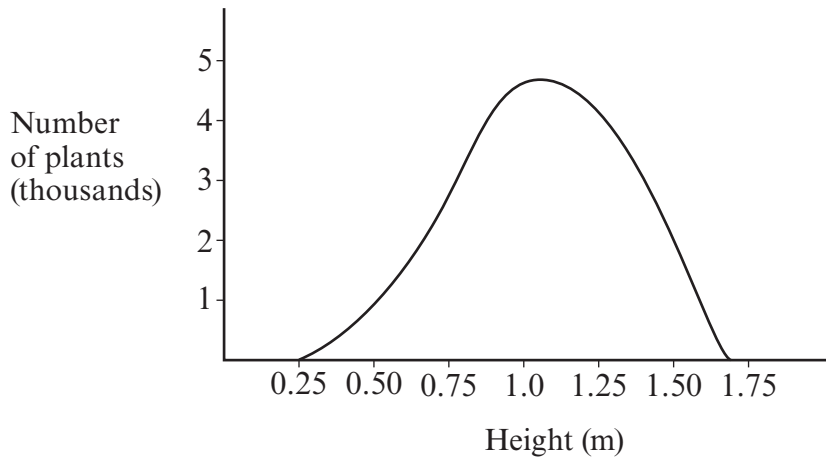
Height (m)

(a) Complete the sentences below using some words from the list. [2]

asexual   environmental   genetic   sexual

The plants were grown in the same conditions, so the differences in height are due mostly

to .... causes. Differences in appearance between individuals are

common because of .... reproduction.

(b) Some variations may be inherited from parents.

Which of the following can be inherited in humans?

Place a tick (✓) in the box against the **two** correct answers. [2]

mutation in a gamete   ☐

broken bone   ☐

eye colour   ☐

mutation in a skin cell   ☐

6. *(a)* Complete the following sentences about genes.

(i) Genes are made of a chemical called [1]

....

(ii) Genes are linked together to form structures called [1]

....

(iii) Each gene is a code for the production of a different [1]

....

(b) The diagram shows the number of chromosomes present in a male and female body cell. The production of gametes and fertilisation are also shown.
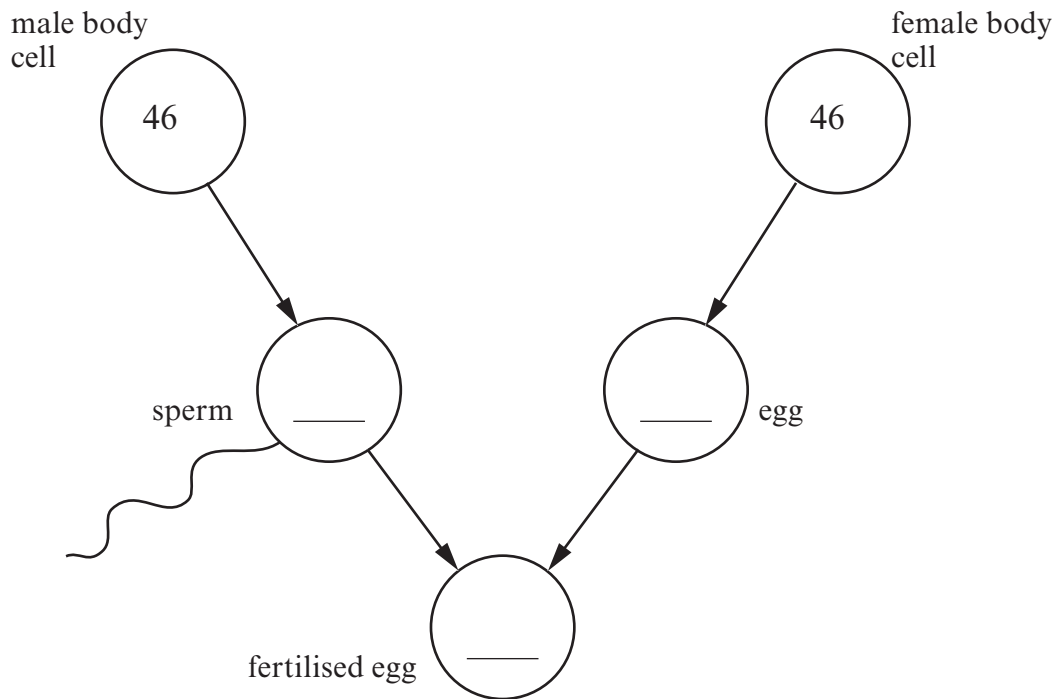
Complete the diagram to show the number of chromosomes in the sperm, egg and fertilised egg. [2]

Turn over.

7. *(a)* The eatwell plate shows the types and percentages of foods that we should eat for a healthy diet.

The eatwell plate

Fruit and vegetables (33%)

Bread, rice potatoes, pasta and other starchy foods **(33%)**

Meat, fish, eggs, beans and other non-dairy sources of protein **(12%)**

Food and drinks high in fat and/or sugar

Milk and dairy foods **(15%)**

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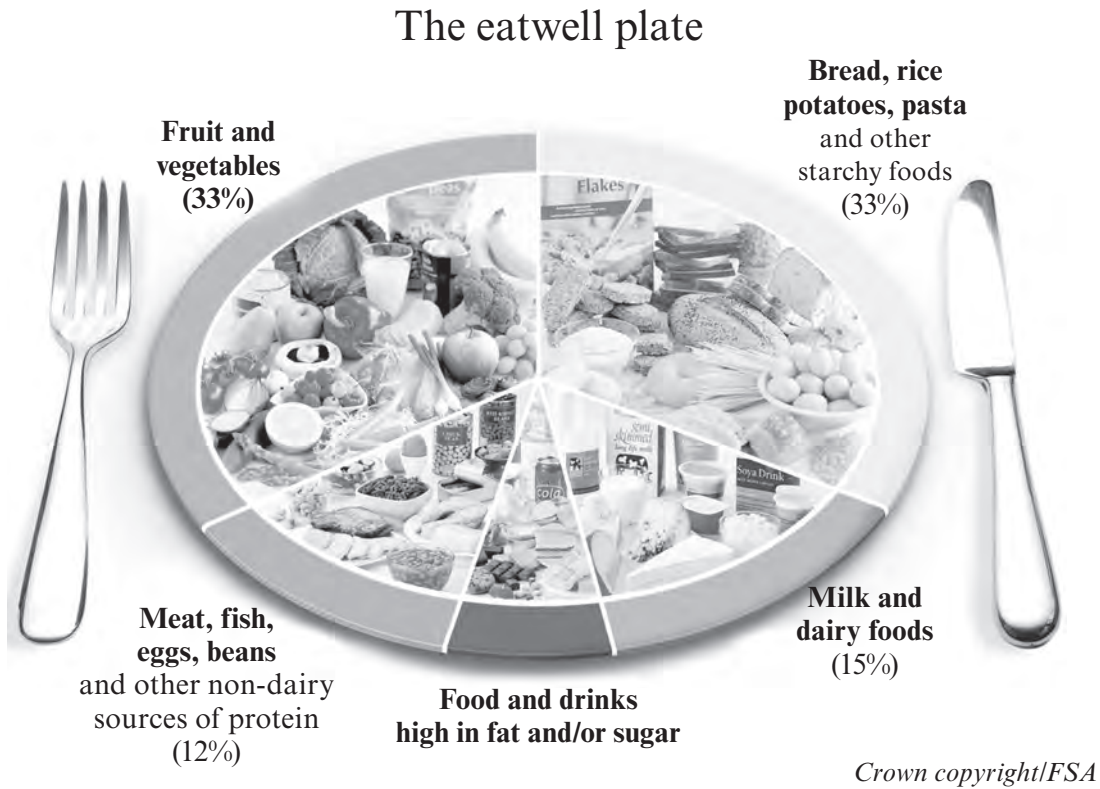
Calculate the percentage of the eatwell plate that should come from **Foods and drinks high in fat and/or sugar**. Show your working. [2]

Answer .... %

(b) The chart below shows the percentages of different types of food bought at the shops.

Bread, rice
potatoes, pasta and
other starchy foods
19%

Fruit and vegetables
24%

Milk and dairy foods
21%

Meat, fish, eggs, beans
and other non-dairy
sources of protein
13%

Foods and drinks
high in fat and/or
sugar
23%
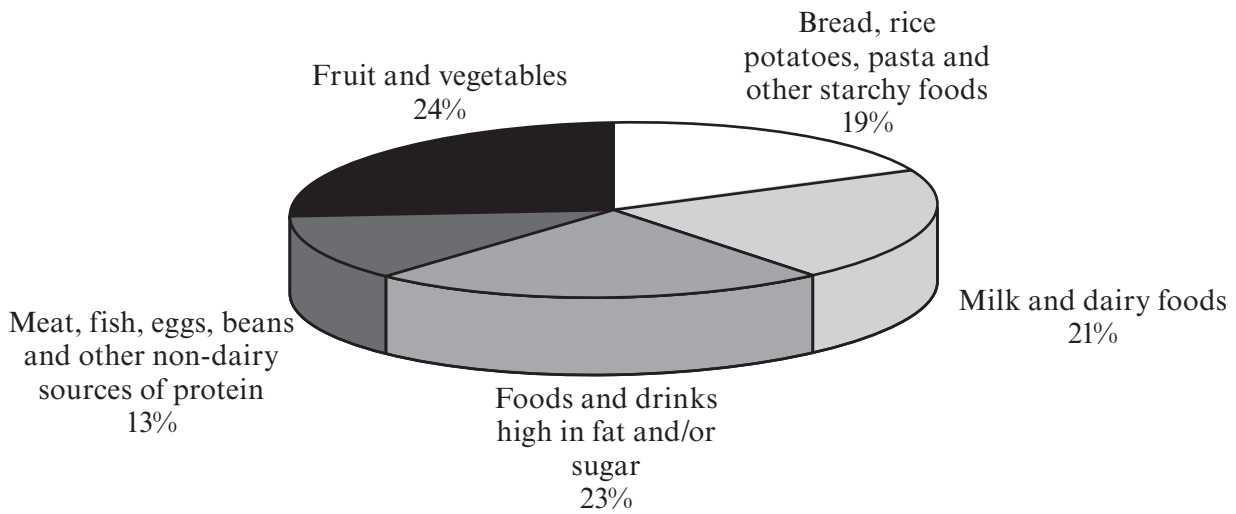
Crown copyright/FSA

Which **three** types of food are bought in greater percentages than shown in the eatwell
plate? Tick (✓) the three boxes. [1]

Meat, fish, eggs ☐

Fruit and vegetables ☐

Bread, rice, potatoes, pasta ☐

Milk and dairy foods ☐

Foods and drinks high in fat and/or sugar ☐

Turn over.

(c) The table below shows the fat content of a meal.

Food	Fat content (g)
Doner kebab	50.2
Mayonnaise	11.5
Packet of crisps	11.5
Doughnut	13.3
Total	86.5

The Guideline Daily Amount of fat for an average female is 70g.
Calculate the excess fat content of this meal. [1]

Answer .... g

(d) Why do food labels often give information on fat content **per 100g of food**? [1]

....

(e) Explain why it is unhealthy to eat too much fat. [2]

....

....

....

....

(f) Give **one** use for fat in the human body. [1]

....

8. The hormone insulin helps to keep blood glucose levels within a narrow, normal range.

The graph shows changes in blood glucose levels during a period of eight hours and the points when more insulin was released into the blood.
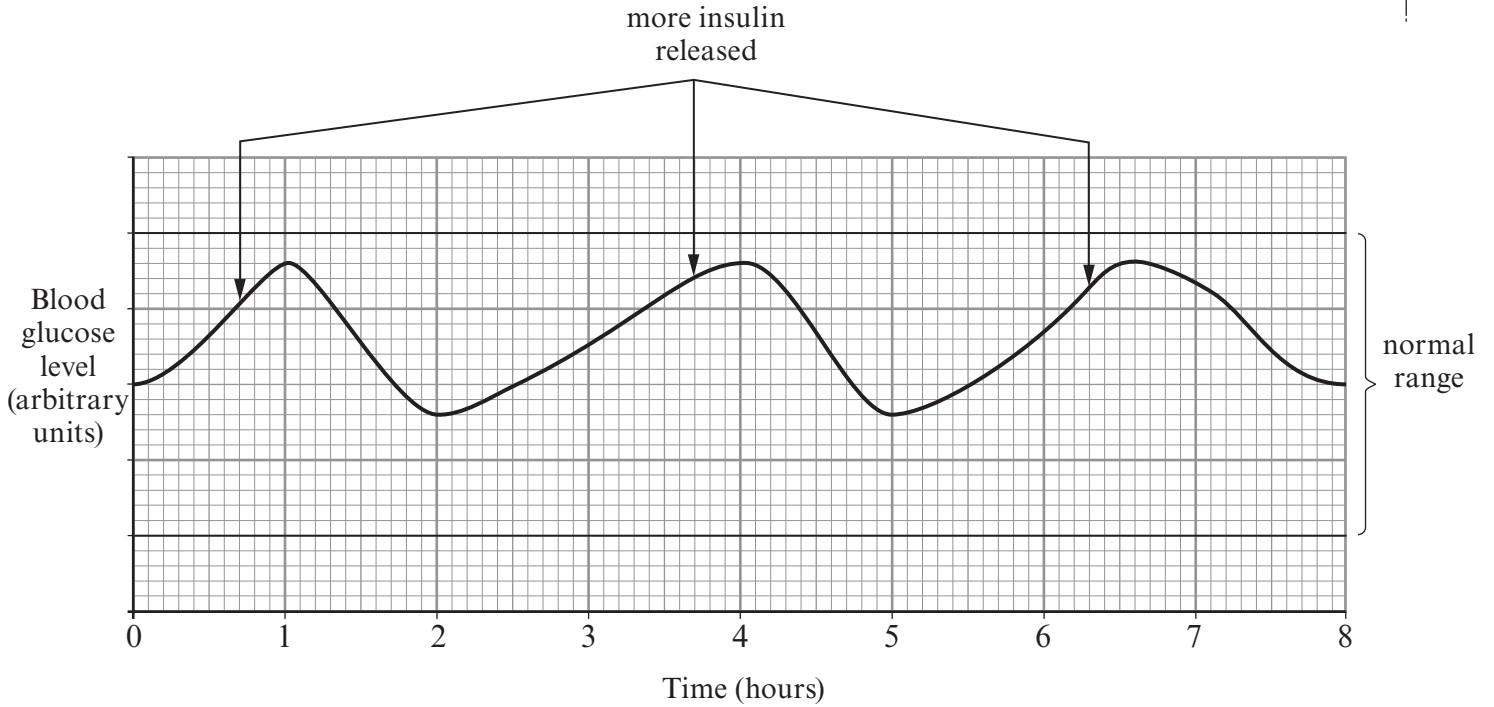
Use the above information, **and your own knowledge**, to explain how blood glucose levels are controlled in the human body. [6 QWC]

....

....

....

....

....

....

....

....

....

....

....

Turn over.

6

9. The legal blood alcohol limit for driving in the UK is 80 mg of alcohol per 100 ml of blood. In some countries, it is illegal to drive with **any** alcohol in the blood. This is the zero limit.

(a) (i) Why is it dangerous to drive after exceeding the legal limit of blood alcohol? [1]

....

....

(ii) Give **one** reason why some people think that there should be a **zero** limit in the UK. [1]

....

....

(b) Alcohol is an addictive drug.
Explain what is meant by 'an addictive drug'. [2]

....

....

....

4

10. Red squirrels and grey squirrels live in woodland. The two squirrel species compete for similar resources. Where the two species share the same habitat, the greys usually outcompete the reds.

Red squirrel   Grey squirrel

The island of Anglesey used to have a large population of red squirrels. In the early 1970s, grey squirrels started to arrive across the road bridges. The number of grey squirrels on the island grew rapidly. By the mid 1980s, red squirrels had disappeared from many parts of the island. In 1998, conservation groups started to control the numbers of grey squirrels and the red squirrel was re-introduced into several woodlands.

(a) Anglesey is 710 km^2 in area. Only 3% of the area is mature woodland suitable for red squirrels.

Calculate the area of woodland suitable for red squirrels. Show your working. [2]

.... km^2

(b) Give **two** resources for which both squirrel species compete. [2]

1. ....

2. ....

(c) Apart from competition between the squirrels for resources, give **two** *other* factors that might limit the size of the squirrel populations. [2]

1. ....

2. ....

Examiner only

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