

Homeostasis

Question Paper

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.5 Homeostasis and Response
Sub-Topic	Homeostasis
Difficulty Level	Bronze Level
Booklet	Question Paper

Time Allowed: 55 minutes

Score: / 55

Percentage: /100

Grade Boundaries:

Q1. Diabetes is a disease in which the concentration of glucose in a person's blood may rise to fatally high levels.

Insulin controls the concentration of glucose in the blood.

- (a) Where is insulin produced?

Draw a ring around **one** answer.

gall bladder

liver

pancreas

(1)

- (b) People with diabetes may control their blood glucose by injecting insulin.

- (i) If insulin is taken by mouth, it is digested in the stomach.

What type of substance is insulin?

Draw a ring around **one** answer.

carbohydrate

fat

protein

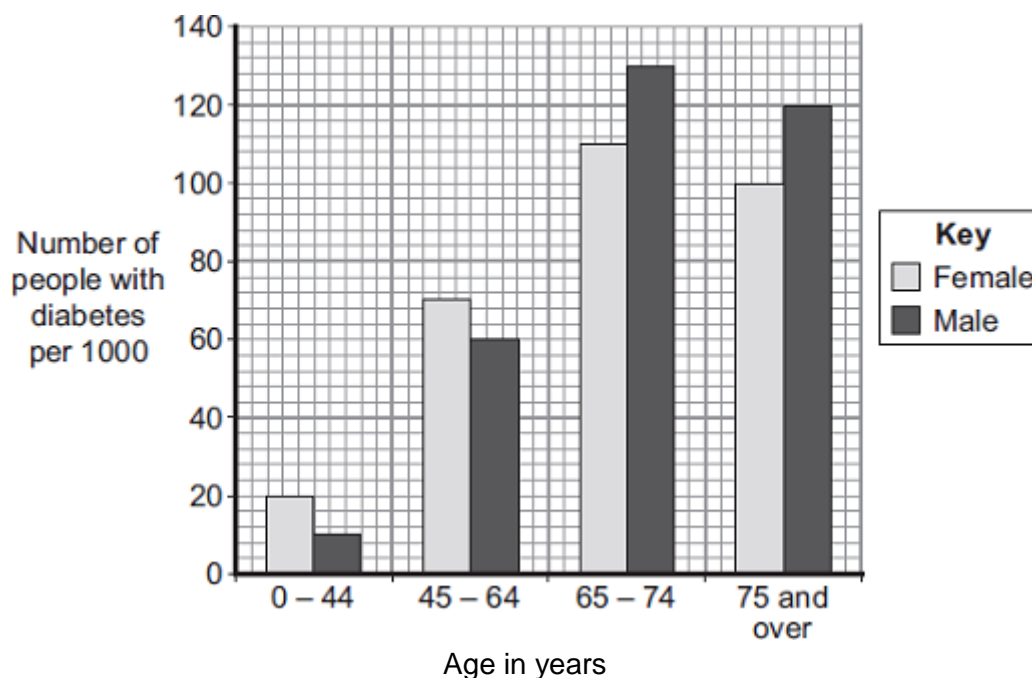
(1)

- (ii) Apart from using insulin, give **one** other way people with diabetes may reduce their blood glucose.

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(1)

- (c) The bar chart shows the number of people with diabetes in different age groups in the UK.



- (i) Describe how the number of males with diabetes changes between the ages of 0 – 44 years and 75 years and over.

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(3)

- (ii) Compare the number of males and females with diabetes:
between the ages of 0 and 64 years

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.....

over the age of 65 years.

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(2)
(Total 8 marks)

Q2. Type 1 diabetes develops when the body does not produce enough insulin.

- (a) Which organ produces insulin?

.....

(1)

- (b) One treatment for diabetes is to inject insulin.

The table gives the properties of four different types of insulin, **A**, **B**, **C** and **D**.

Type of insulin	Time taken for the insulin to begin to work in minutes	Time taken for insulin to reach maximum concentration in the blood in minutes	Time when insulin is no longer effective in hours
A	15-20	30-90	3-4
B	30-60	80-120	4-6
C	120-240	360-600	14-16
D	240-360	600-960	18-20

- (i) Some people with diabetes need to inject insulin just before a meal to stop a big increase in blood sugar concentration.

Which type of insulin, **A**, **B**, **C** or **D**, should these people with diabetes inject just before a meal?

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Give the reason for your answer.

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(2)

- (ii) A person with diabetes is told to inject type **B** insulin immediately after breakfast at 09.00.
The person with diabetes is told to then inject a second type of insulin at lunchtime at 12.00.
The second type of insulin should keep the blood sugar level under control for the rest of the 24 hours.

Which type of insulin, **A**, **C** or **D**, should this person with diabetes inject at lunchtime?

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Give the reason for your answer.

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(2)

- (iii) Apart from injecting insulin, give **one** other way in which Type 1 diabetes can be controlled.

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(1)

(Total 6 marks)

Q3. Our bodies control the concentration of glucose in the blood.

Draw a ring around the correct answer to complete each sentence.

- (a) The concentration of glucose in the blood is controlled by a

hormone called

carbohydrase.

insulin.

protease.

(1)

(b) This hormone is produced by the

intestine.
stomach.
pancreas.

(1)

(c) If the body does not produce enough of this hormone,

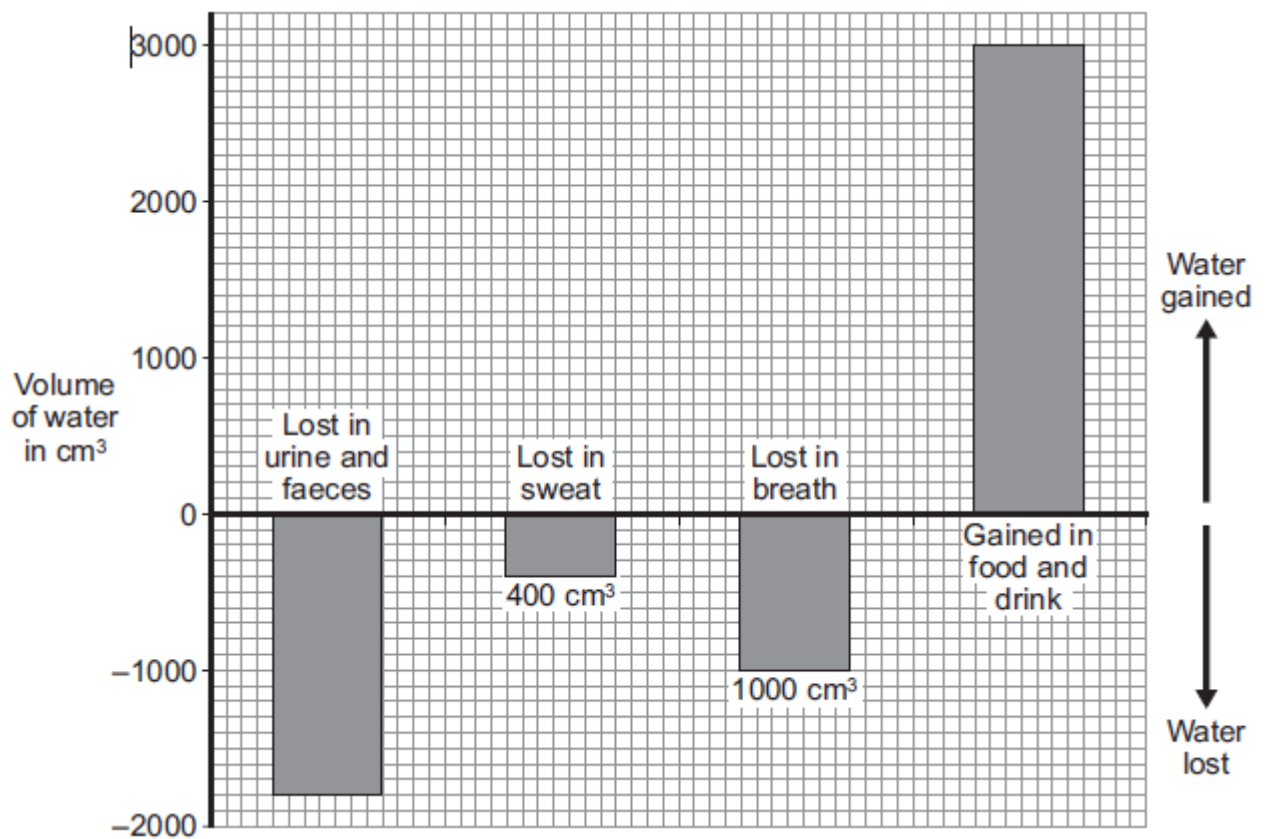
the person develops

diabetes.
cystic fibrosis.
Huntington's disease.

(1)
(Total 3 marks)

Q4. The bar chart shows different ways in which water is lost from and gained by the body on one day.

The volumes of water lost in the sweat and in the breath are labelled on the bars.



- (a) How much water was lost in the urine and faeces? cm³

(1)

- (b) Water is lost from the body in urine, faeces, sweat and breath.

What was the total volume of water lost from the body on this day?

Show clearly how you work out your answer.

.....

Answer = cm³

(2)

- (c) The volume of water lost should balance the volume of water gained.

What should the person do to balance the water gained with the water lost?

.....

.....

(2)
 (Total 5 marks)

Q5. Diabetes is a disease in which blood glucose (sugar) concentration may rise more than normal.

(a) Which organ in the body monitors this rise in blood sugar?

Draw a ring around your answer.

liver

pancreas

stomach

(1)

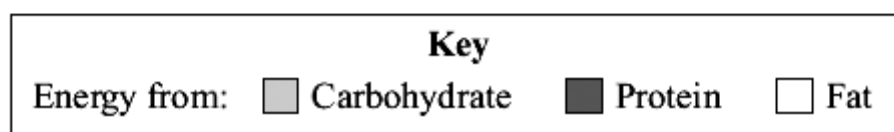
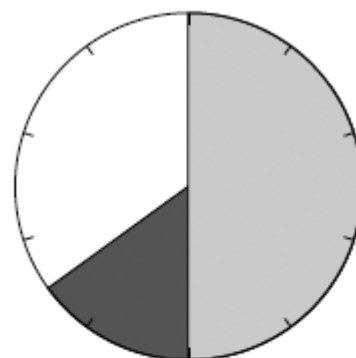
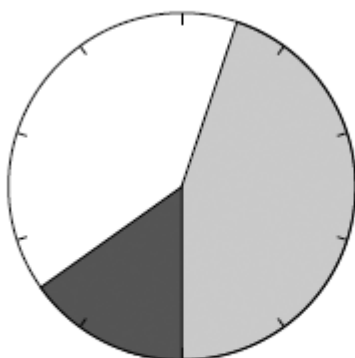
(b) One way of treating diabetes is by careful attention to diet.

Chart 1 shows the recommended diet for a person with diabetes.

Chart 2 shows a diet for a person without diabetes.

Chart 1 Person with diabetes

Chart 2 Person without diabetes



How is the recommended diet of a person with diabetes different from the diet of a

person without diabetes?

Use information from the charts.

Tick (✓) **two** box.

The diabetic should get more energy from fat.

☐

The diabetic should get more energy from protein.

☐

The diabetic should get less energy from carbohydrate.

☐

The diabetic should get less energy from protein.

☐

(2)

(c) Other than diet, give **one** way in which diabetes may be treated.

.....

.....

(1)

(Total 4 marks)

Q6. Diabetes is a disease in which the concentration of glucose in a person's blood may rise to fatally high levels. Insulin controls the concentration of glucose in the blood.

(a) Where is insulin produced?

Draw a ring around **one** answer.

gall bladder

liver

pancreas

(1)

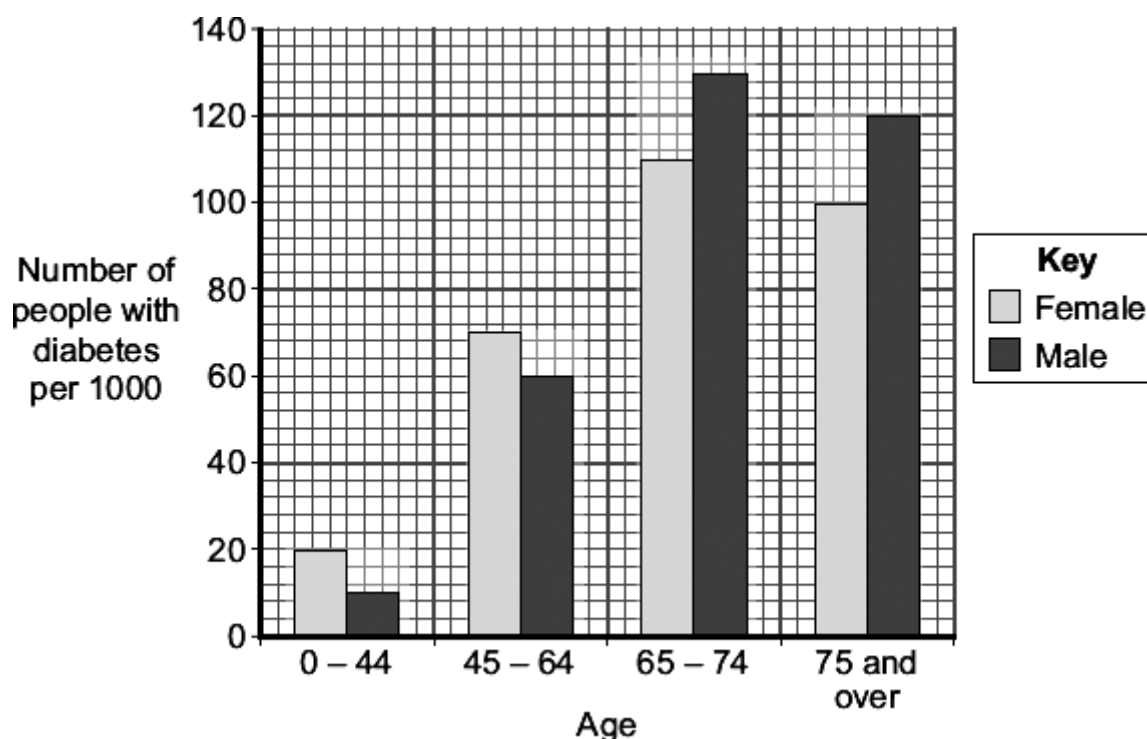
- (b) Diabetics may control their blood glucose by injecting insulin.

Apart from using insulin, give **one** other way diabetics may reduce their blood glucose.

.....

(1)

- (c) The bar chart shows the number of people with diabetes in different age groups in the UK.



- (i) Describe how the number of males with diabetes changes between the ages of 0 - 44 and 75 and over.

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(3)

- (ii) Compare the number of males and females with diabetes:
between the ages of 0 and 64 years

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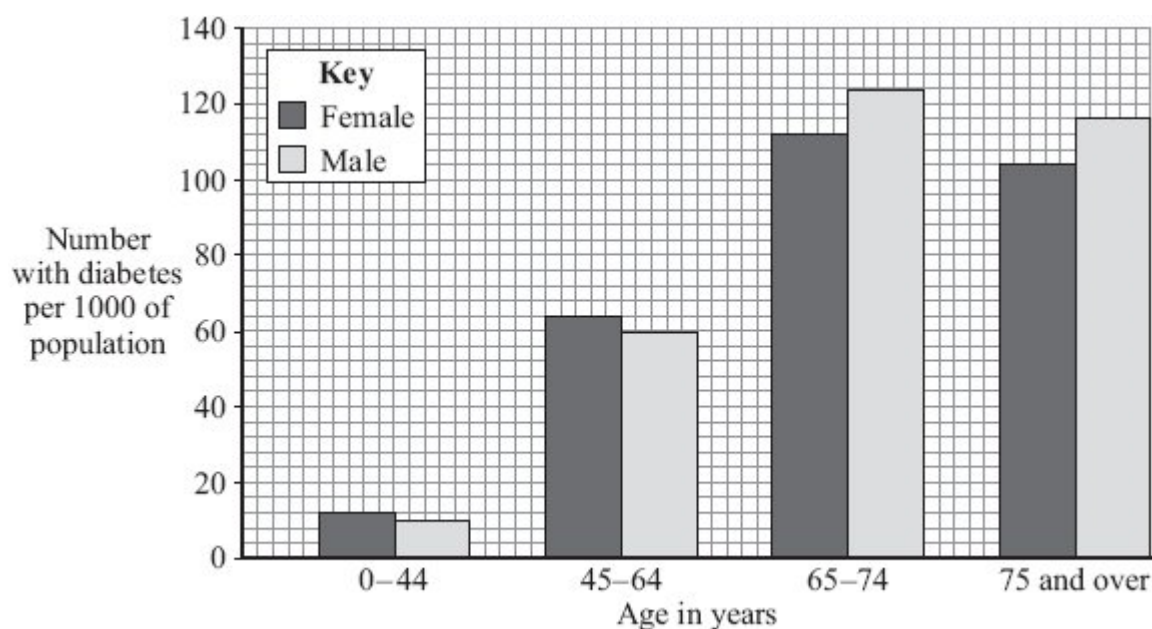
over the age of 65.

.....
.....

(2)
(Total 7 marks)

Q7. Diabetes is caused when the body does not produce enough insulin.

- (a) The bar graph shows the number of people with diabetes per 1000 of population.



- (i) How many more males aged between 45 and 64 years of age have diabetes than males under 45 years of age?

Show clearly how you work out your answer.

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.....

Answer per 1000 of population

(2)

- (ii) Describe the way in which the number of females with diabetes changes with age.

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.....

(2)

- (b) One way of treating diabetes is by injecting insulin.

Insulin is a protein.

- (i) If insulin is taken by mouth, it is broken down in the digestive system.

Where in the digestive system would insulin be broken down?

Draw a ring around your answer.

liver

mouth

stomach

(1)

- (ii) Give **one** way of treating diabetes instead of using insulin.

.....

.....

(1)

(Total 6 marks)

- Q8.** The table shows four ways in which water leaves the body, and the amounts lost on a cool day.

	WATER LOSS (cm ³)	
	COLD DAY	HOT DAY
Breath	400	the same
Skin	500	
Urine	1500	
Faeces	150	

- (a) (i) Fill in the table to show whether on a hot day the amount of water lost would be

less more the same

The first answer has been done for you.

(3)

- (ii) Name the process by which we lose water from the skin.

.....

(1)

- (b) On a cool day the body gained 2550 cm³ of water.
1500 cm³ came directly from drinking.
Give **two** other ways in which the body may gain water.

1

2

(2)

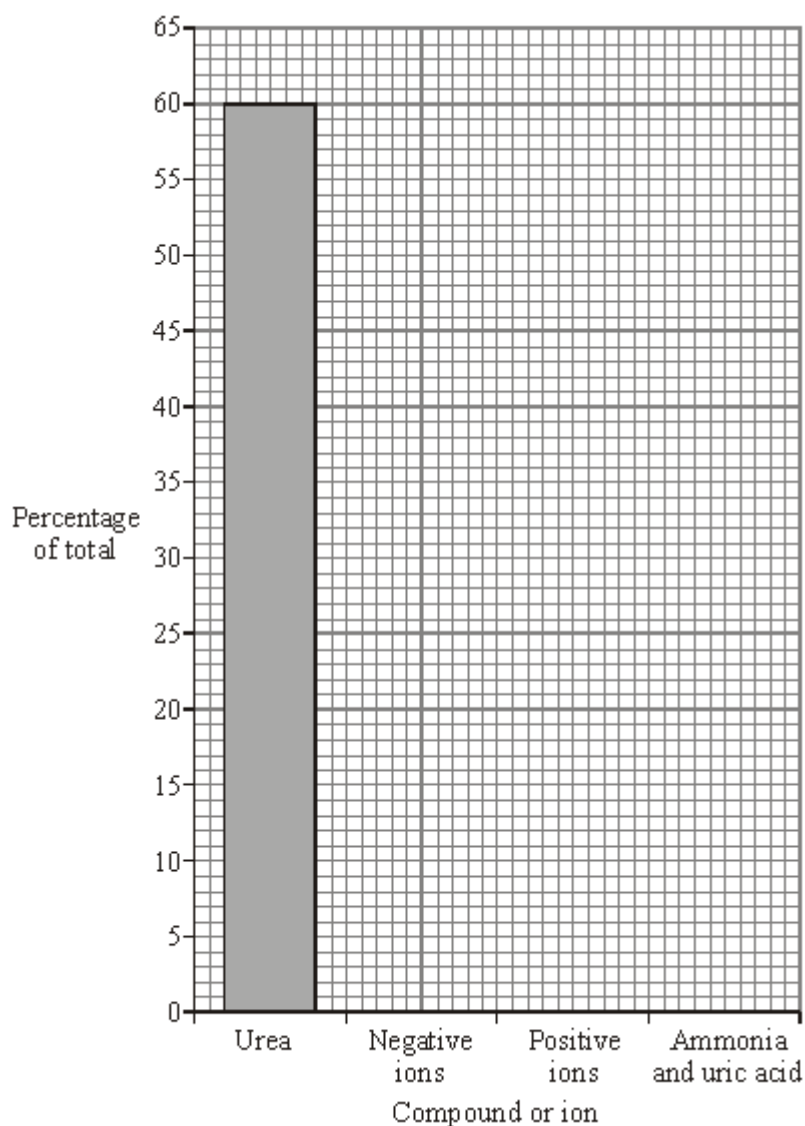
(Total 6 marks)

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- (a) The table shows the compounds and ions dissolved in a student's urine.

Compound or ion	Percentage of total
urea	60
negative ions	25
positive ions	10
ammonia and uric acid	5

- (i) Complete the bar chart. One bar has been drawn for you.



(2)

- (ii) There is a total of 10 g of compounds and ions dissolved in a sample of this student's urine. Calculate the mass of urea in the sample. Show clearly how you work out your answer.

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Mass of urea g

(2)

- (b) Use words from the box to complete the sentences.

anus	bladder	kidneys	liver	lungs
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Plasma transports carbon dioxide from the body to the

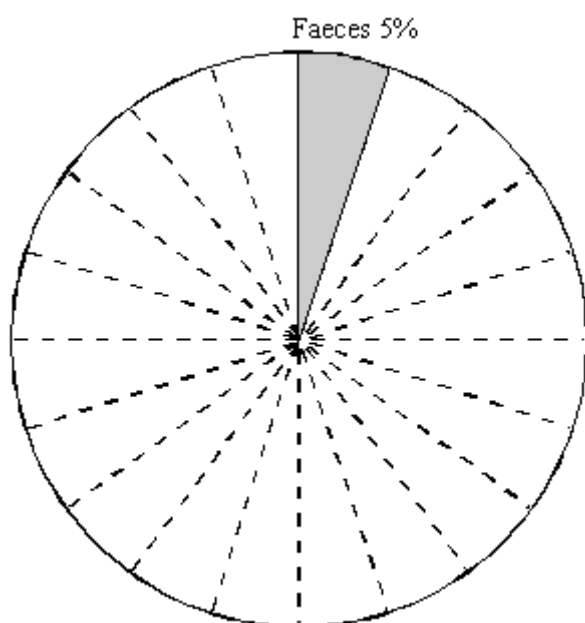
Plasma transports urea from the to the

(3)
(Total 7 marks)

Q10. The table below shows how the body loses water.

HOW WATER IS LOST	% (PERCENTAGE)
Breathing	10
Faeces	5
Sweat	45
Urine	40

Complete the diagram by showing the water loss for breathing, sweat and urine.



(Total 3 marks)