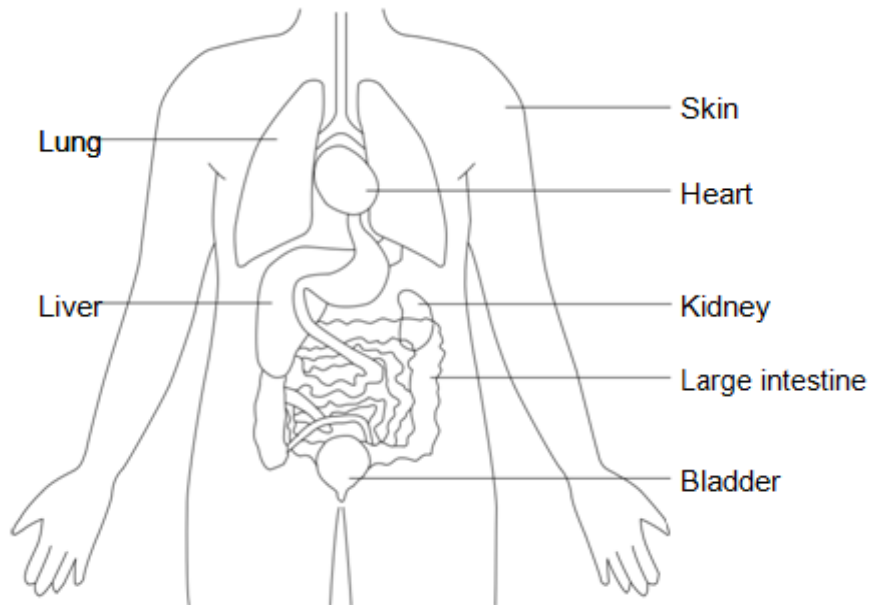


Homeostasis

Q:1 The diagram shows some of the organs of the human body.



(a) Which organ labelled on the diagram:

(a) (i) produces urine _____

(1 mark)

(a) (ii) stores urine _____

(1 mark)

(a) (iii) produces urea _____

(1 mark)

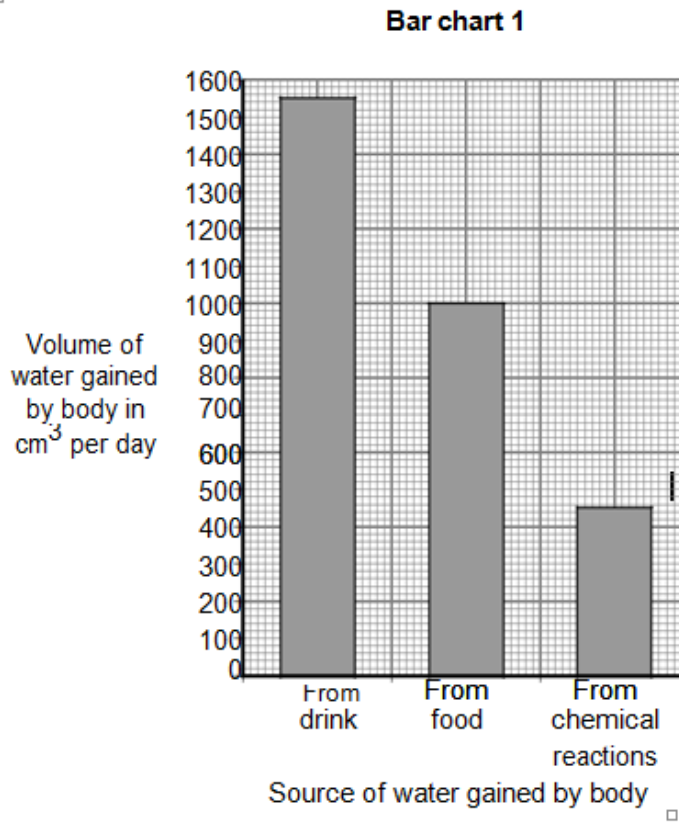
(a) (iv) gets rid of carbon dioxide _____

(1 mark)

(a) (v) helps to control body temperature? _____

(1 mark)

(b) Bar chart 1 shows the volume of water the human body gains each day.



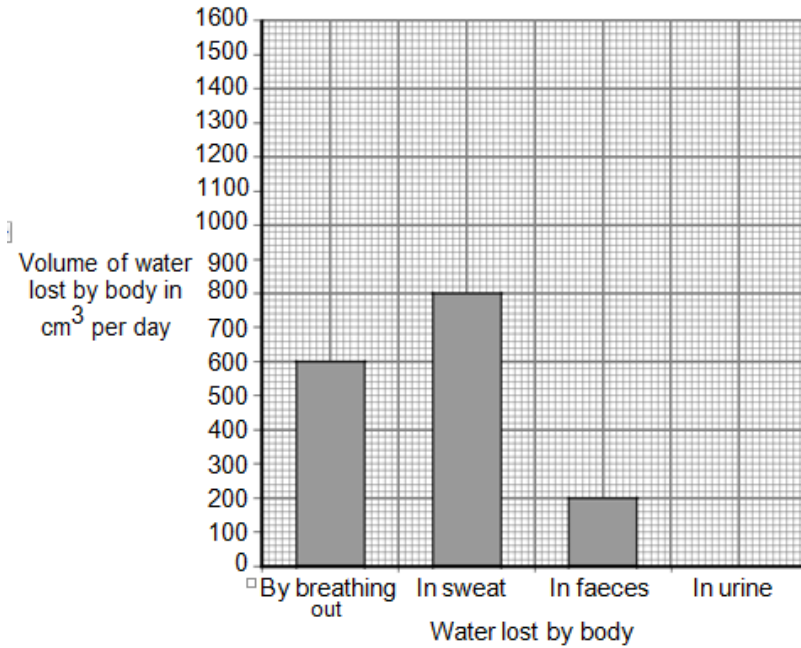
(b) (i) Calculate the total volume of water the body gains each day.

Total volume of water gained = _____ cm³

(2 marks)

Bar chart 2 shows the volume of water lost each day by breathing out, in sweat and in faeces.

Bar chart 2



(b) (ii) Calculate the total volume of water lost each day by breathing out, in sweat and in faeces.

Volume = _____ cm³

(1 mark)

(b) (iii) The volume of water the body loses must balance the volume of water the body gains.

Use your answers to part (b)(i) and part (b)(ii) to calculate the volume of water lost in urine.

Volume of water lost in urine = _____ cm³

(1 mark)

(b) (iv) Plot your answer to part (b)(iii) on Bar chart 2.

(1 mark)

(b) (v) After taking some types of recreational drugs, the kidneys produce very little urine. What happens to the body cells if the kidneys produce very little urine?

(1 mark)

Q:2 Many runners drink sports drinks to improve their performance in races.

A group of students investigated the effects of three brands of sports drink, A, B and C, on the performance of three runners on a running machine. One of the runners is shown in Figure 4.

Figure 4



Table 2 gives information for each drink.

Table 2

	Brand of sports drink		
Nutrient per dm ³	A	B	C
Glucose in g	63	31	72
Fat in g	9	0	2
Ions in mg	312	332	495

(a) (i) In the investigation, performance was measured as the time taken to reach the point of exhaustion.

Exhaustion is when the runners could not run anymore.

All three runners:

- ☐ ran on a running machine until the point of exhaustion
- ☐ each drank 500 cm³ of a different brand of sports drink
- ☐ rested for 4 hours to recover
- ☐ ran on the running machine again and recorded how much time they ran until the point of exhaustion.

The speed at which the runners ran was the same and all other variables were controlled.

The students predicted that the runner drinking brand B would run for the shortest time on the second run before reaching the point of exhaustion.

Use information from Table 2 to suggest an explanation for the students' prediction.

[2 marks]

(a) (ii) If the balance between ions and water in a runner's body is not correct, the runner's body cells will be affected.

Describe one possible effect on the cells if the balance between ions and water is not correct.

[1 mark]

(b) When running, a runner's body temperature increases.

Describe how the brain monitors body temperature.

[3 marks]

(c) (i) Table 2 is repeated here to help you answer this question.

	Brand of sports drink		
Nutrient per dm ³	A	B	C
Glucose in g	63	31	72
Fat in g	9	0	2
Ions in mg	312	332	495

People with diabetes need to be careful about drinking too much sports drink.

Use information from Table 2 to explain why drinking too much sports drink could make people with diabetes ill.

[3 marks]

(c) (ii) Other than paying attention to diet, how do people with diabetes control their diabetes?

[1 mark]

Q:3 (a) Use words from the box to complete the sentences about controlling conditions in our bodies.

Kidney liver lungs skin

(i) When we breathe out, water leaves the _____

(1 mark)

(ii) When we sweat, water leaves the body through the _____

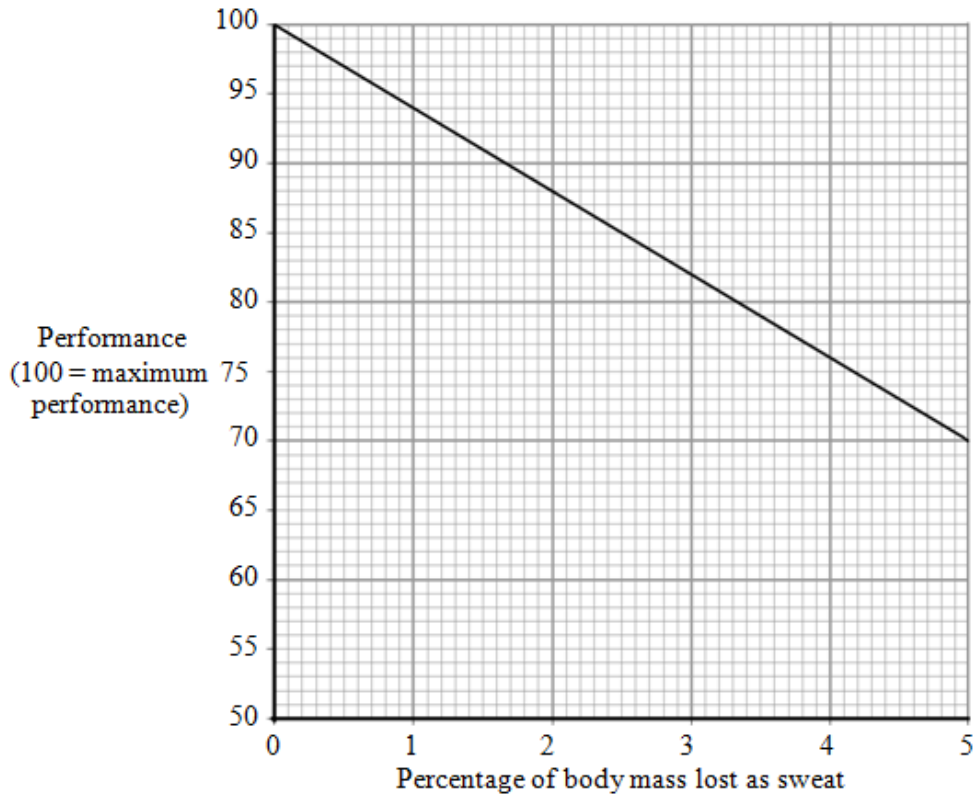
(1 mark)

(iii) Excess water leaves the body in a liquid called urine. Urine is produced by the _____

(1 mark)

(b) We lose a lot of sweat during exercise. When this happens, we cannot perform as well as we could at the start of the exercise.

The graph shows the effect of losing sweat on the performance of an athlete.



(i) Describe the effect of losing sweat on performance.

(1 mark)

(ii) How can athletes reduce this effect on performance?

(1 mark)

Q:4 The body controls internal conditions.

(a) Use words from the box to complete the sentences about water loss from the body.

kidneys liver lungs skin

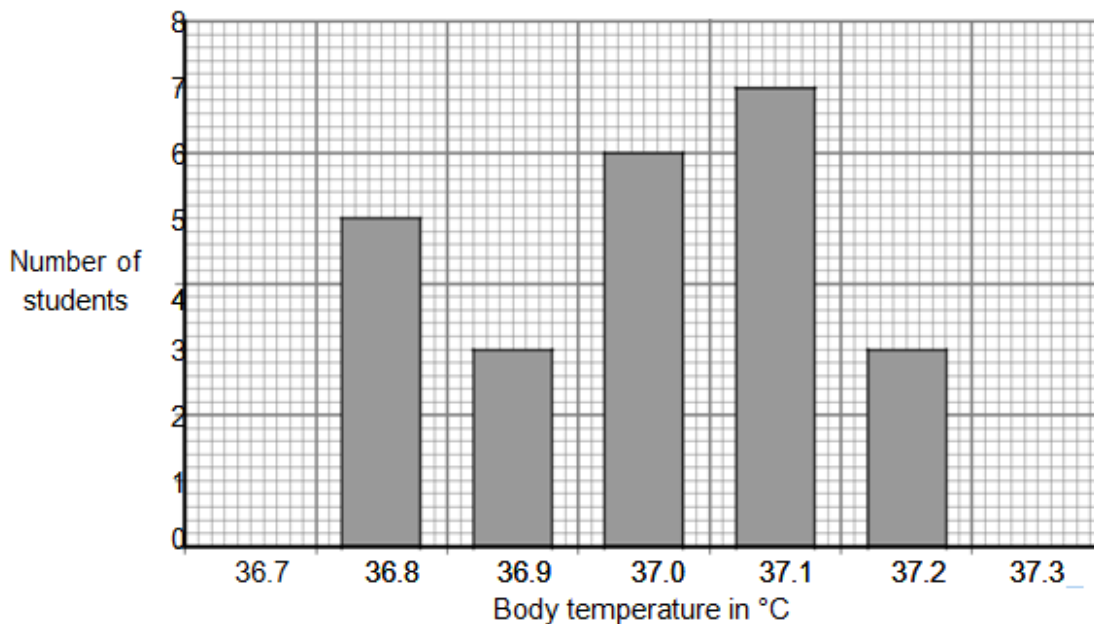
(a) (i) Water is lost in sweat via the _____ **(1 mark)**

(a) (ii) Water is lost in urine via the _____ **(1 mark)**

(a) (iii) Water is lost in the breath via the _____ **(1 mark)**

(b) Students investigated body temperature in the class.

The bar chart shows the results.



(b) (i) One student used the bar chart to calculate the mean body temperature of the class.

The student calculated the mean body temperature as 37.0 °C.

How did the student use the bar chart to calculate the mean?

(2 marks)

(b) (ii) How many students had a body temperature higher than the mean of 37.0 °C?

(1 mark)

(b) (iii) Body temperature must be kept within a narrow range. Why?

(1 mark)

Q:5 (a) We control many conditions inside our bodies.

Name three conditions which are controlled inside our bodies.

- 1 _____
- 2 _____
- 3 _____

(3 marks)

(b) Hormones are used to control fertility in women. Use words from the box to complete the sentences.

antibiotic contraceptive drug fertility drug vaccine

A woman can prevent pregnancy by taking a _____

A woman can be helped to become pregnant by taking a _____

(2 marks)

(c) Some drugs are addictive.

(i) Name one addictive drug.

(1 mark)

(ii) Explain why it is very difficult to give up using an addictive drug.

(2 marks)

TOTAL MARKS=41