OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



EXAM QUESTION PACK

B3.3 MAINTAINING INTERNAL ENVIRONMENTS

SCORE	PERCENTAGE
/190	%

STEMUP

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Gateway Biology A (9-1)

Maintaining internal environments

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **190**.
- The total number of marks may take into account some 'either/or' question choices.

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1 Probash is ill and is having tests in hospital.

His doctors monitor his body temperature frequently.

Explain why it is important to monitor Probash's body temperature frequently.

[2]

2 One treatment for heart valve problems is to lower the patient's blood pressure.

To lower the blood pressure, a drug can be taken to **increase** the amount of water excreted by the body.

Which organ would be targeted by the drug and what effect would it have on the urine?

organ _____

effect on urine _____

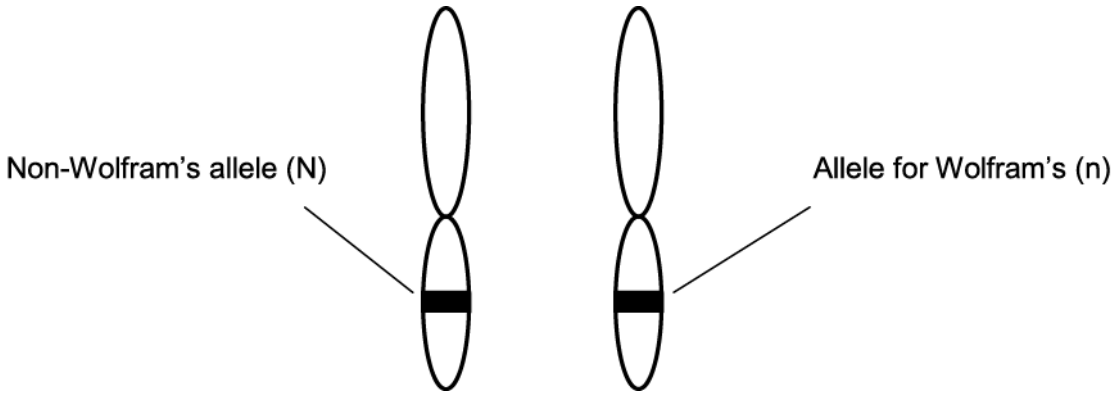
[2]

3 Wolfram's Syndrome is a genetic disorder.

It is caused by a recessive allele (n).

In people with Wolfram's syndrome, a protein does not function correctly.

The diagram shows a pair of chromosomes from a person called Tim.



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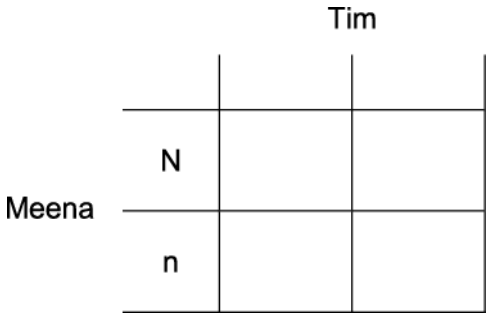
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(i) Meena is expecting a baby.

Tim is the father.

Complete this genetic diagram.



[2]

(ii) Wolfram's syndrome can affect the production of hormones from the pancreas.

Meena and Tim's doctor tells them that there is a chance that their baby will have problems controlling its blood glucose level.

Explain why the doctor thinks this.

Use information from part **(i)** and your biological knowledge.

[4]

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4 Which reduces heat transfer from the skin?

A shivering
B sweating
C vasoconstriction
D vasodilation

Your answer ☐

[1]

5 If ADH levels rise, how will this affect urine?

A higher concentration of urea
B higher volume
C lower concentration of sodium chloride
D more dilute

Your answer ☐

[1]

6 Scientists have tested the genes of a number of people who have diabetes.

They have found that there are about four different versions of a gene that can cause diabetes.

Why might this discovery be important?

A Diabetes cannot be treated at the current time.
B Different patients with diabetes can be given different drugs.
C All types of diabetes can be treated by changing the diet.
D Glucagon injections will be able to treat these four types of diabetes.

Your answer ☐

[1]

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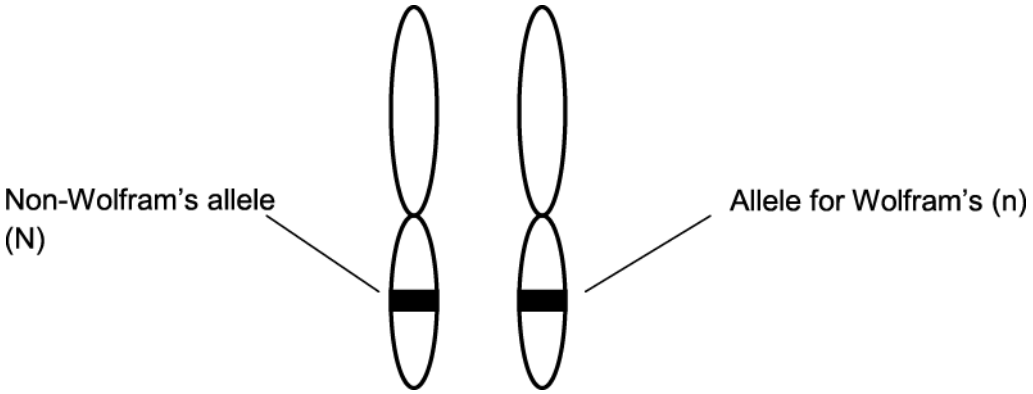
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7 Wolfram's Syndrome is a genetic disorder.

It is caused by a recessive allele (n).

In people with Wolfram's syndrome, a protein does not function correctly.

(i) The diagram shows a pair of chromosomes from a person called Tim.



Meena is expecting a baby.

Tim is the father.

Complete this genetic diagram.

		Tim	
Meena	N		
	n		

[2]

(ii) Wolfram's syndrome can affect the pancreas.

Meena and Tim's doctor tells them that there is a chance that their baby will have problems controlling their blood glucose level.

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Explain why the doctor thinks this.

Use information from part **(i)** and your biological knowledge.

---

[4]

8 Singapore is a small country.

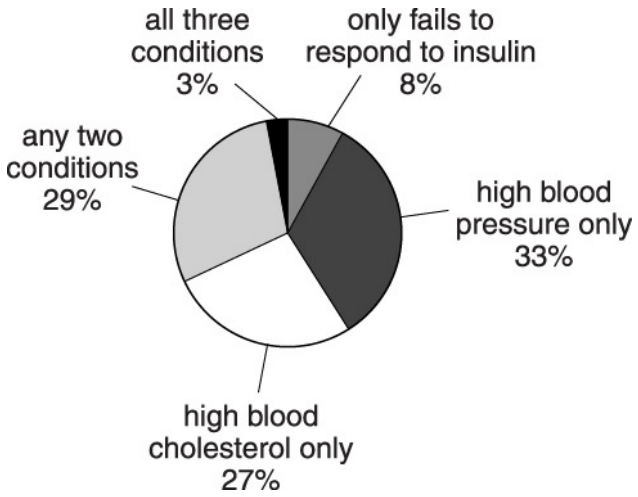
Everyone living in Singapore was offered a health check to test for three conditions.

They were tested:

- for high blood pressure
- for high levels of blood cholesterol
- to see if they failed to respond to insulin.

The check found that one million people had at least one of these conditions.

The pie chart shows the results for these one million people.



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The government is worried about the possible consequences of these results for many of the people.

Explain the most serious consequences of these results for the health of the people.

Use calculations to support your answer.

The quality of written communication will be assessed in your answer to this question.

[6]

9 Sweat glands in the skin release sweat.

Explain how sweat can cool the body down.

[2]

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10 One of the symptoms of malaria is a fever.

In a fever, the body temperature may rise to over 40 °C.

(i) How does the body monitor the rise in body temperature?

---[2]

(ii) One way to cool down is by vasodilation.

Explain how vasodilation cools a body.

---[2]

11 Malaria causes a fever.

The body temperature is very high during a fever and this may cause death.

Describe how high body temperatures can cause death.

---[2]

12 Singapore is a small country.

Everyone living in Singapore was offered a health check to test for three conditions.

They were tested:

- for high blood pressure
- for high levels of blood cholesterol
- to see if they failed to respond to insulin.

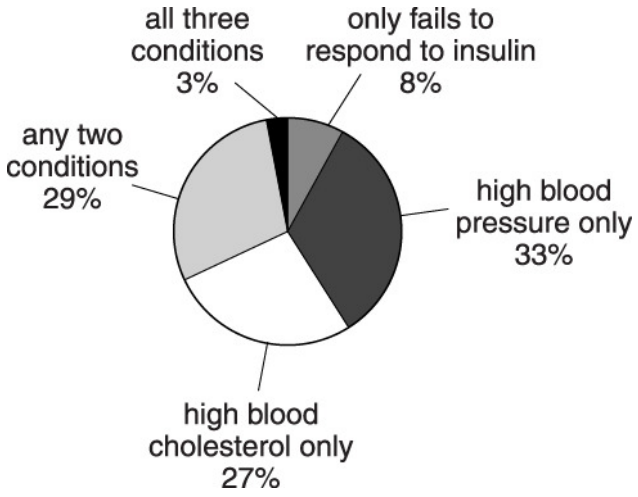
The check found that one million people had at least one of these conditions.

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The pie chart shows the results for these one million people.



The government is worried that large numbers of people may develop serious diseases.

Use the data and your biological knowledge to explain why the government is worried.
In your answer, include the links between the conditions tested for and the diseases they may cause. Include calculations to support your answer.

The quality of written communication will be assessed in your answer to this question.

[6]

13 Sweat glands in the skin release sweat.

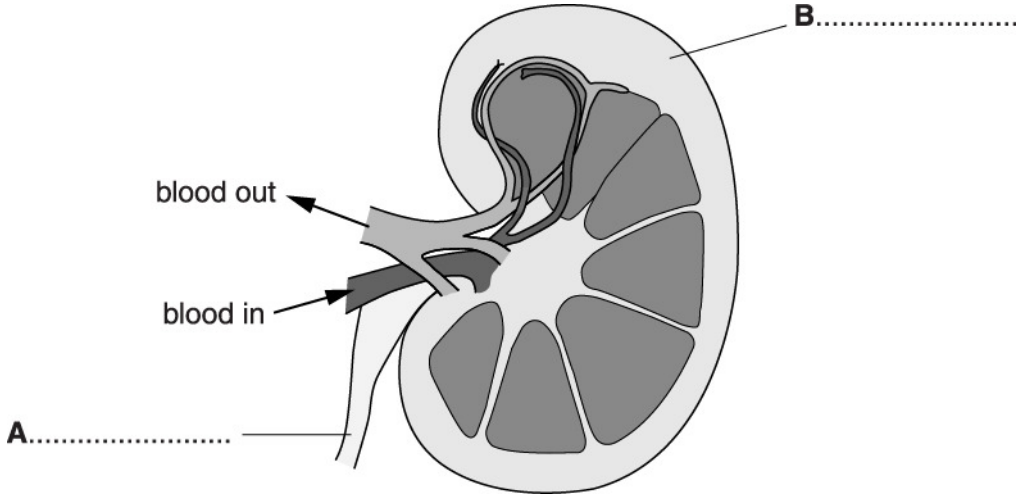
Why does the body release sweat?

[1]

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14 Kidneys are important organs in excretion.

The diagram shows a section through a kidney.



(i) Finish the diagram by adding the names of parts **A** and **B**.

[2]

(ii) It is important that the blood entering the kidney is at high pressure.

Write down why this is important for the correct working of the kidney.

---

[1]

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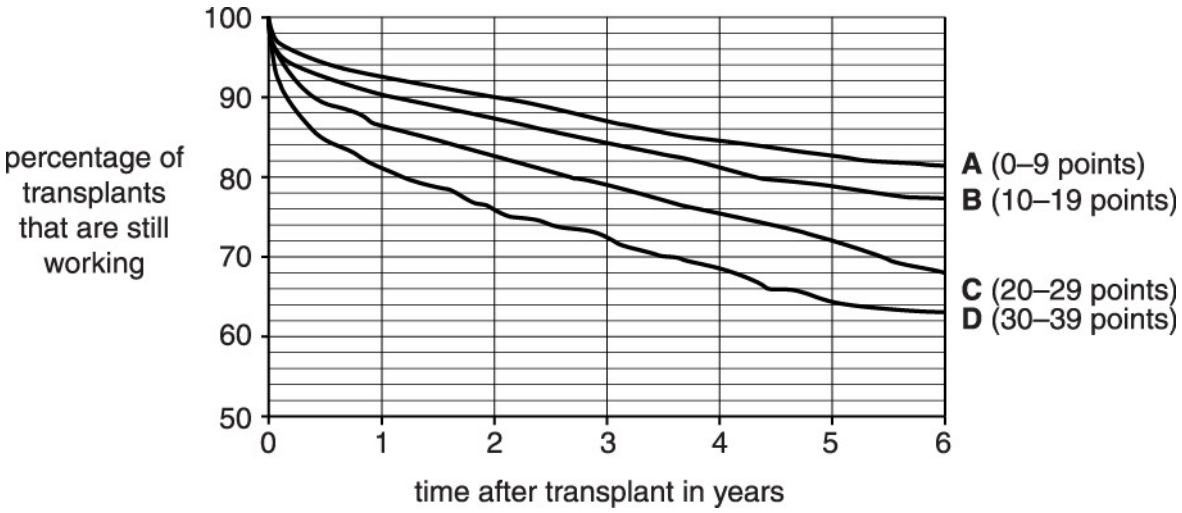
15(a) A person may donate one of their kidneys.

Before they do this they are marked on a Donor Scoring System.

This gives them points for different factors such as their age.

The points are added up and turned into a grade **A**, **B**, **C** or **D**.

The graph shows the effect of the grade on the success of a transplant.



Describe the patterns shown in the graph.

---[2]

(b) Kidneys are important organs in excretion.

Manjit and Georgina are each going to donate a kidney.

These are their donor score sheets.

Manjit

Feature	Points scored
43 years old	10
renal function	2
blood pressure	3
tissue antigens	2
body mass 65 kg	0
Total points	17

Georgina

Feature	Points scored
52 years old	15
renal function	2
blood pressure	3
tissue antigens	2
body mass 95 kg	1
Total points	

Georgina and Manjit both donate a kidney.

After 5 years, their donated kidneys have a different percentage chance of still working.

What is the difference between these two percentages?

Use the tables and information in the graph.

--- [2]

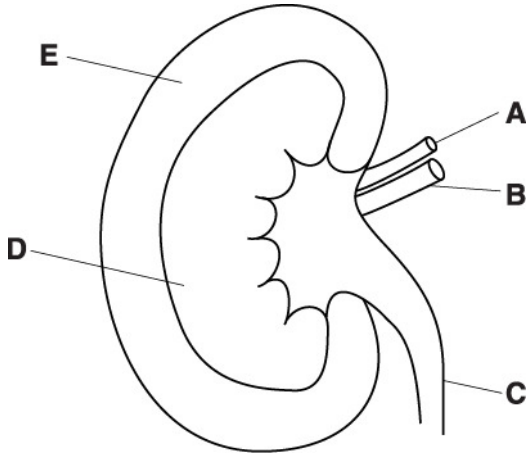
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16(a) This question is about how the body controls urine concentration.

Look at the diagram of a kidney.



Match each letter to the correct part of the kidney.

One has been done for you.

Part of the kidney	Letter
cortex	
medulla	
renal artery	A
renal vein	
ureter	

[2]

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(b) Water intake affects urine concentration.

Alcohol reduces the amount of anti-diuretic hormone (ADH) released.

Drinking 2 litres of either water or alcoholic beer will make the urine more dilute.

However, the urine concentration is different in each case.

Explain how drinking 2 litres of water or alcoholic beer makes urine more dilute and why the concentrations would be different.



The quality of written communication will be assessed in your answer to this question.

---

[6]

17 Henry has just eaten a chocolate bar.

The table shows the concentration of glucose in the blood entering and leaving some of Henry's organs.

	Concentration of glucose in grams per litre	
Organ	**Blood entering the organ**	**Blood leaving the organ**
liver	14	9
pancreas	9	7
small intestine	9	14
stomach	9	6

Glucose concentration **increases** as blood passes through one of the organs.

Write down the name of this organ and explain why glucose concentration increases.

Name of organ _____

Explanation _____

---[3]

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18 Kaye is an athlete.

She is resting the day before she runs a long race.

The tables show the water taken in and the water lost by Kaye during the rest day.

	water taken in in cm^3
in food	1000
made by respiration	300
drinking	1200

	water lost in cm^3
in sweat	800
in faeces	100
in urine	

Kaye takes in the same amount of water as she loses.

Work out how much water Kaye loses in urine on the rest day.

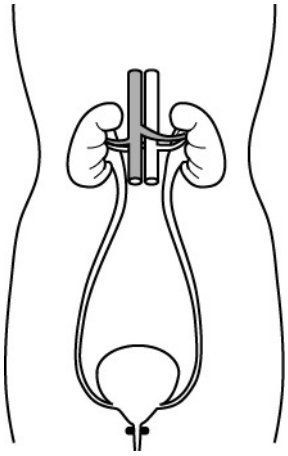
Explain how and why the data in the tables is likely to change on the day of the race.



The quality of written communication will be assessed in your answer to this question.

[6]

19 Kidneys are important organs in excretion.



Write down **one** substance that is normally excreted by the kidneys.

---------- [1]

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20 This question is about diabetes.



Jessica is an athlete. She has diabetes.

Jessica can help control her blood sugar levels by controlling her diet.

She must **also** inject herself with insulin every day.

Write down which type of diabetes Jessica has.

Explain your answer.

---

[1]

21 This question is about diabetes.



Jessica is an athlete. She has diabetes.

Jessica can help control her blood sugar levels by controlling her diet.

She must **also** inject herself with insulin every day.

Jessica needs to change the amount of insulin she injects during each day.

Jessica plans a training run immediately after breakfast.

Explain how this changes the amount of insulin she would need to inject.

---

[2]

22 Malaria causes a fever.

The body temperature is very high during a fever and this may cause death.

Describe how high body temperatures can cause death.

---

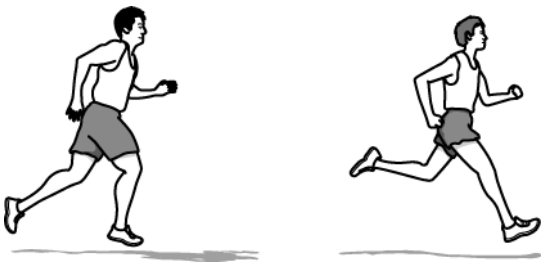
[2]

23 The skin is an organ of excretion.

It excretes water from the body in sweat.

Two athletes run in a long race.

They measure their body mass before and after the race.



	Leroy	Sanchez
body mass before race (in kg)	90	64
body mass after race (in kg)	88	60

If a person loses too much water it can make them dehydrated.

The level of dehydration can be worked out using this table.

Percentage change in body mass	Level of dehydration	Symptoms
+1.0 to −1.0	no dehydration	–
−1.1 to −3.0	slightly dehydrated	dry lips, thirsty
−3.1 to −5.0	moderately dehydrated	muscles work less efficiently
−5.1 to −8.0	very dehydrated	muscle spasms and cramps

Leroy works out that his percentage change in body mass was **−2.2%**.

Work out Sanchez's percentage change.

Use the table to explain which person was most likely to have finished the race.

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[2]

24 The skin is an organ of excretion.

It excretes water from the body in sweat.

Two athletes run in a long race.

They measure their body mass before and after the race.





	Leroy	Sanchez
body mass before race (in kg)	90	64
body mass after race (in kg)	88	60

If a person loses too much water it can make them dehydrated.

The level of dehydration can be worked out using this formula and the table.

$$\text{percentage change in body mass} = \frac{\text{mass after the race} - \text{mass before the race}}{\text{mass before the race}} \times 100$$

Percentage change in body mass	Level of dehydration	Symptoms
+1.0 to −1.0	no dehydration	–
−1.1 to −3.0	slightly dehydrated	dry lips, thirsty
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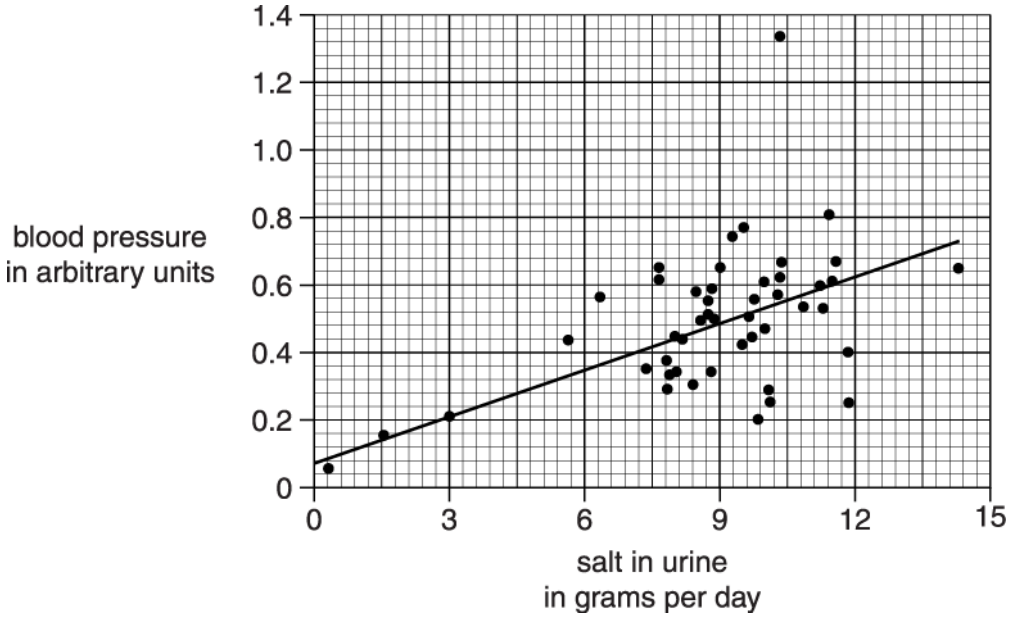
Use the table to explain which person was most likely to have finished the race.

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[3]

25 More salt in the diet gives a higher amount of salt in the urine.

Look at the graph.
It shows the relationship between the amount of salt in urine and blood pressure.



Nicola wants to avoid having too much salt in her diet.
Use the information in the graph and your scientific knowledge to explain why.

[2]

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26 Some people have a condition which means they do **not** release enough ADH.

Suggest what effects this might have.

---

[2]

27

(i) Cats have fur covering their skin.

The fur reduces heat loss from the skin.

Write down the method of heat loss that fur will reduce.

---

[1]

(ii) Cats lick saliva onto their fur more often in hot weather.

Suggest how this might help them during hot weather.

---

[1]

28 Which of these can be used to treat type 2 diabetes but **not** type 1?

A Diet and exercise

B Exercise only

C Insulin and diet

D Insulin, diet and exercise

Your answer [ ] [1]

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29 Transpiration has a cooling effect on the leaves of plants.

Which statement **best** describes how this happens?

A Evaporation of water from the leaf removes heat energy.

B Water entering the stomata takes heat energy from the leaf surface.

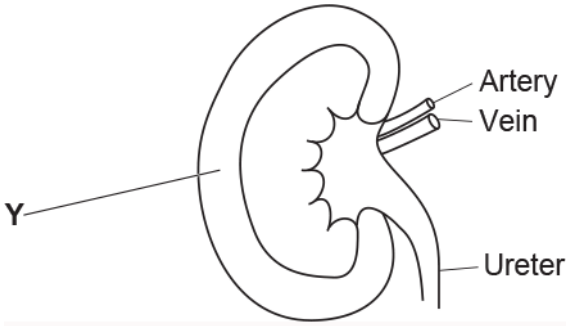
C Water dripping off the leaf causes heat energy to be lost.

D Water falling on the leaf removes heat energy.

Your answer [ ] **[1]**

30(a) Look at the diagram.

It shows a vertical section through a kidney.



(i) What is the name of part **Y**?

---

[1]

(ii) Which liquid flows through the ureter?

---

[1]

(iii) Draw an arrow in the ureter showing the direction that this liquid flows.

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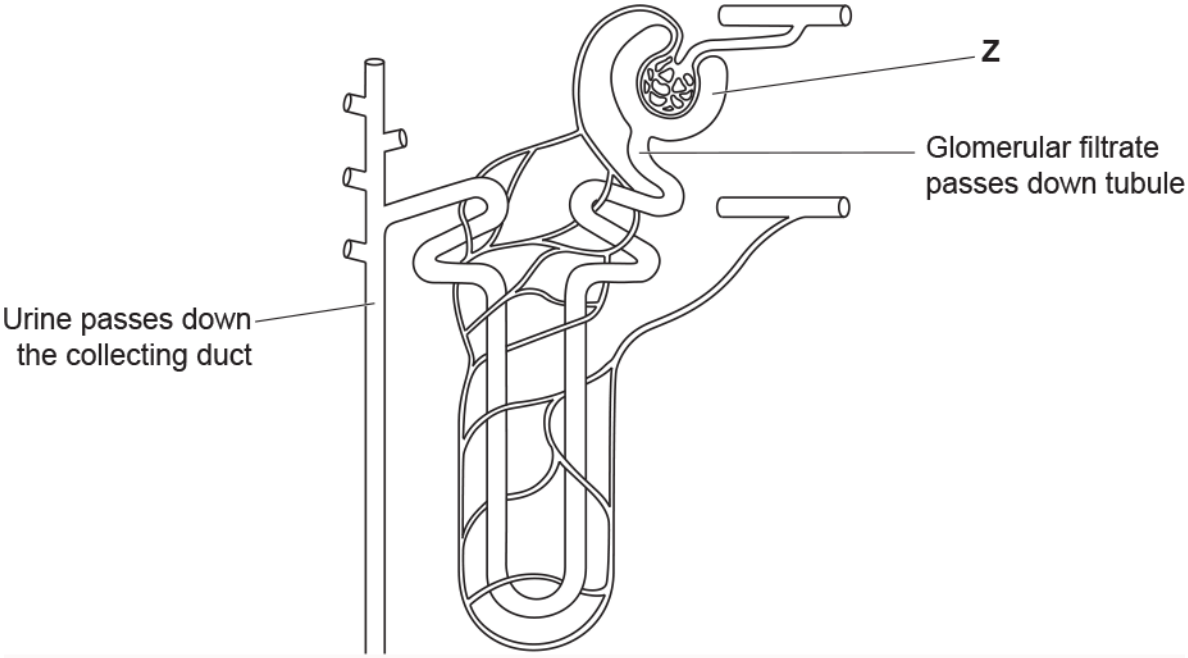
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(b) Look at the diagram. It shows a kidney tubule (nephron).

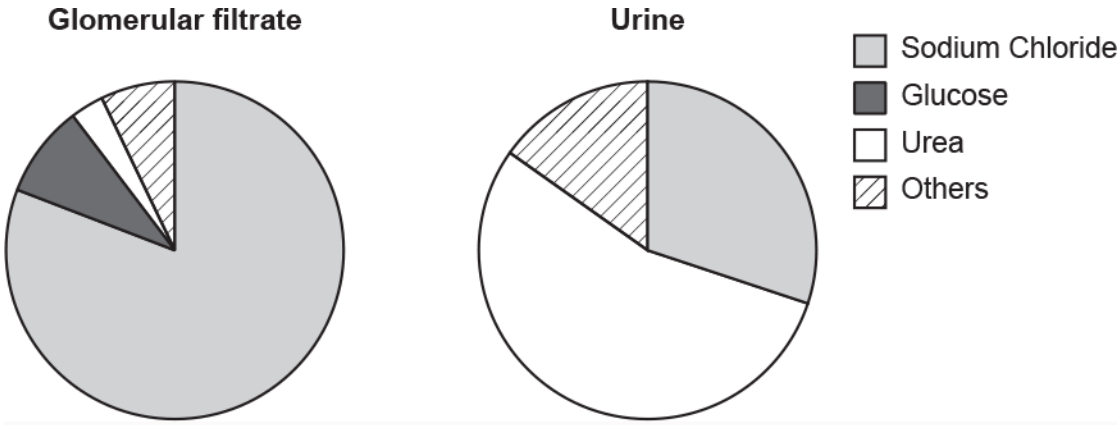


(i) What is the name of part **Z**?

---

[1]

(ii) The diagram shows the composition of glomerular filtrate and urine.



What conclusions can be made about what happens between part **Z** and the collecting duct in the kidney tubule?

Use evidence from the diagram to support your answer.

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---

[3]

(c) The kidney is important for water balance.

The table shows the measurements of water balance for two patients in hospital.

	Volume of water (ml)	
	Patient A	Patient B
Water taken into body in food and drinks	2500	2500
Water made in the body during respiration	200	200
Total input =	2700	2700
Water lost from kidneys in the form of urine	1900	1700
Water lost through skin, lungs and digestive system	1000	1000
Total output =	----------	----------

(i) Calculate the total output for Patient A and Patient B.

Patient A ----------

Patient B ----------

[1]

(ii) Which patient needs treatment for their kidneys?

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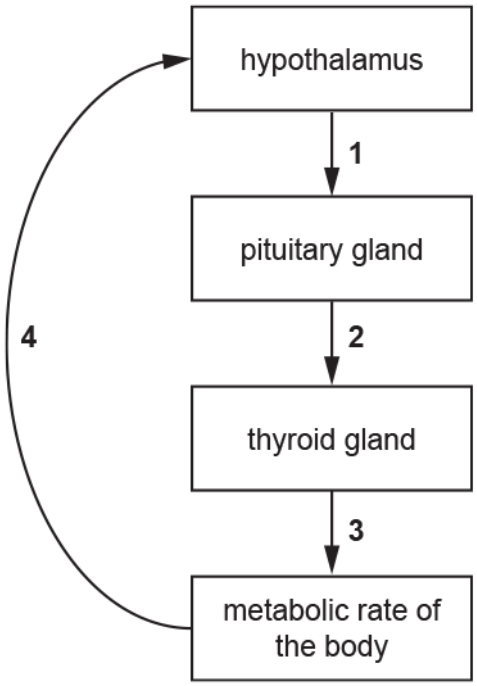
Explain the reasons for your choice.

---

[2]

31 The level of thyroxine in the body is controlled by negative feedback.

The diagram shows how this takes place.



Which numbers on the diagram represent the hormones TSH and thyroxine?

A 2 = thyroxine 3 = TSH

B 1 = TSH 3 = thyroxine

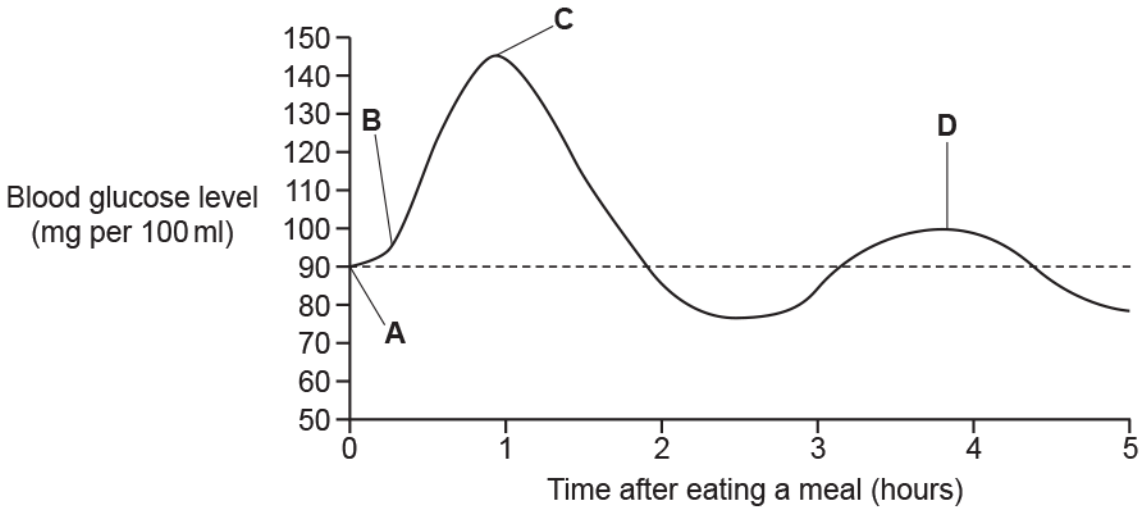
C 3 = TSH 3 = thyroxine

D 2 = TSH 3 = thyroxine

Your answer [ ] [1]

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32 The graph shows blood glucose levels after eating a meal.

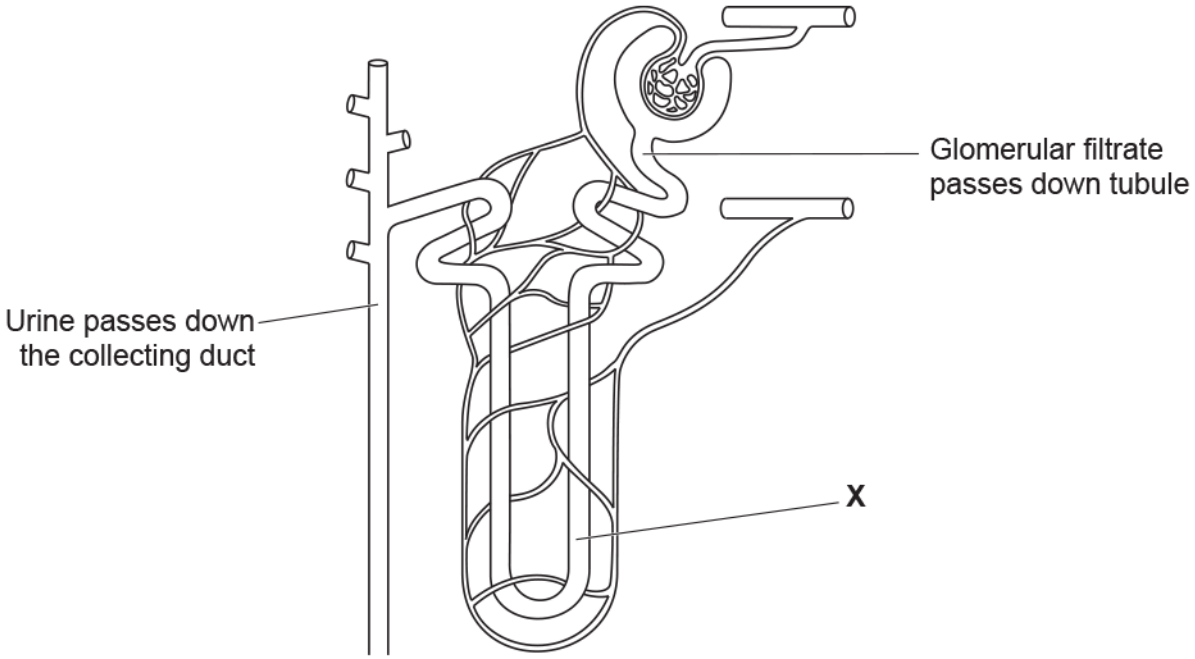


Which point **A**, **B**, **C** or **D** on the graph would the insulin level in the blood be at its highest level?

Your answer [ ] **[1]**

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33(a) The diagram shows a kidney tubule (nephron).



(i) What is the name of part **X**?

---------- [1]

(ii) The hormone ADH affects the permeability of part of the kidney tubule.

Name the part of the tubule affected by ADH.

---------- [1]

(b) * Sports drinks are usually one of three types. Look at the table of information on these types of sports drink.

Sports drink	Concentration of solutes relative to body fluids	Mass of carbohydrates (g) (mainly sugars)	Order of how quickly the drink is absorbed
Hypotonic	Less	<4	1
Isotonic	Same	4 – 8	2
Hypertonic	More	>8	3

An athlete is going to run a 10 000 metre race. About an hour before the race the athlete drinks a hypertonic sports drink.

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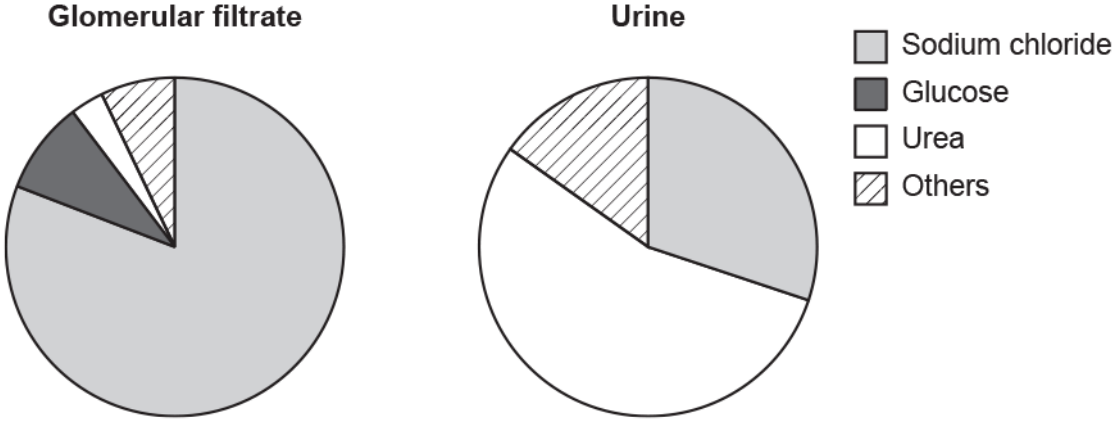
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The athlete completes the 10 000 metre race. After the race the athlete drinks an isotonic sports drink.

Explain how the race causes changes in water, salt and sugar levels in the athlete's body and explain the athlete's choice and timing of drinks.

[6]

(c) The diagram shows the composition of glomerular filtrate and urine.



What evidence is there to suggest that selective reabsorption occurs in the kidney tubule?

Use evidence from the diagram to support your answer.

[4]

34

This question is about control and coordination.

The diagrams show a section through the skin in two different conditions.

Diagram A

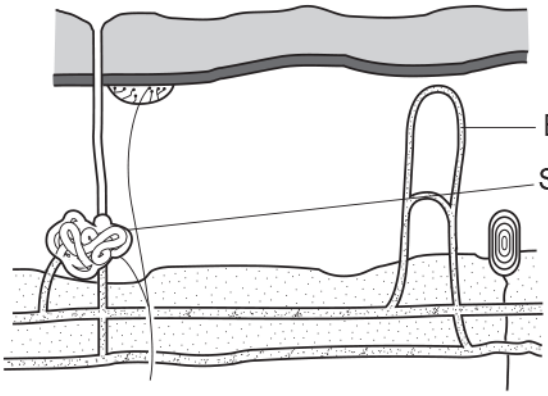
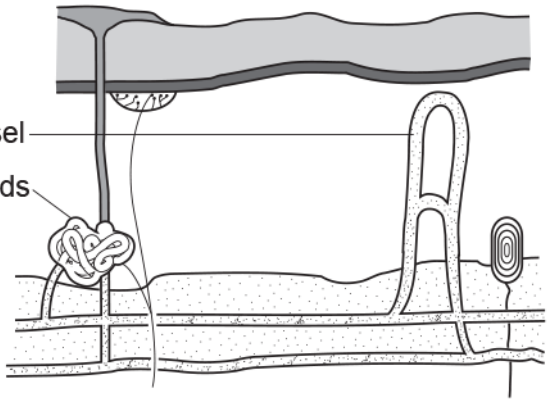


Diagram B



Which diagram shows the skin in a hot, humid environment?

Explain your answer.

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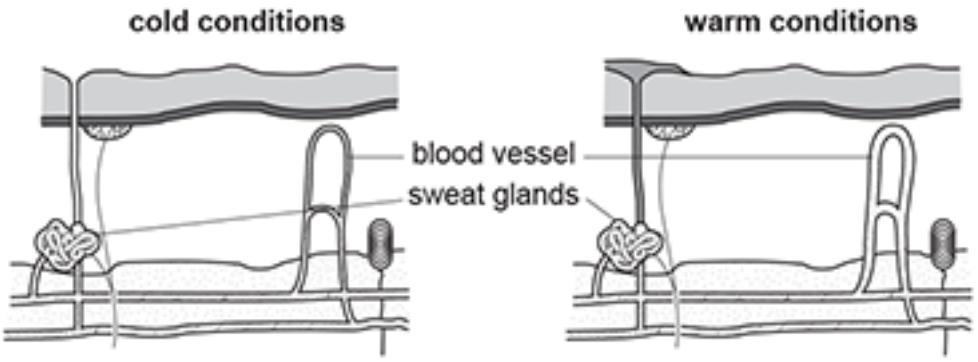
[3]

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35 The diagrams show changes in the skin as a person moves from cold to warm conditions.



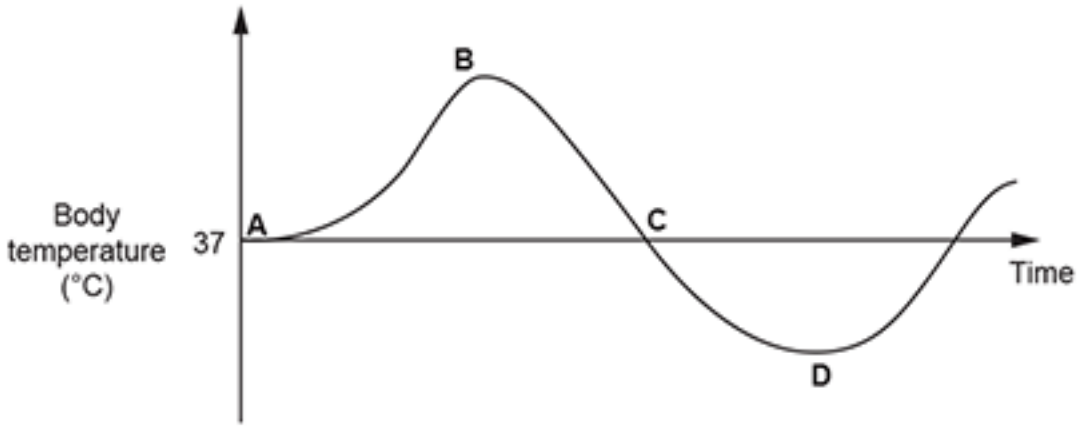
Which processes happen in the skin as a result of the change from cold to warm conditions?

A Blood vessels widen and sweat is released.
B Blood vessels narrow and sweat is released.
C Blood vessels widen and sweat production stops.
D Blood vessels narrow and sweat production stops.

Your answer ☐ [1]

36 The graph shows changes to body temperature during temperature regulation.

Which letter on the graph shows when shivering is occurring?



Your answer ☐ [1]

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37(a)

(i) Diabetes occurs when blood sugar levels are not controlled.

Which hormone reduces blood sugar levels?

..... [1]

(ii) Hormones are produced in endocrine glands.

Describe how hormones control different parts of the body.

[2]

(iii) * A glucose tolerance test can help identify if a person has diabetes.

The graphs show a glucose tolerance test in three people **A**, **B**, and **C**.

Key
- - - - Hormone that controls blood sugar levels
—— Glucose

'The Child with a Metabolic Condition', Chapter 31, www.nursekey.com, Nurse Key.
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Link to material: https://nursekey.com/31-the-child-with-a-metabolic-condition/

One person is healthy and the other two people have different types of diabetes.

Explain the differences between the three graphs and describe how each person with diabetes could control their blood glucose levels.

Use information from the graphs in your answer.

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[6]

(b) Diabetes can often result in high levels of glucose in the urine.

Which organ usually prevents glucose being lost from the blood when urine is made?

[1]

(c) Drugs can be used to treat one type of diabetes. One drug prevents an enzyme working properly.

Suggest how a drug can stop an enzyme working.

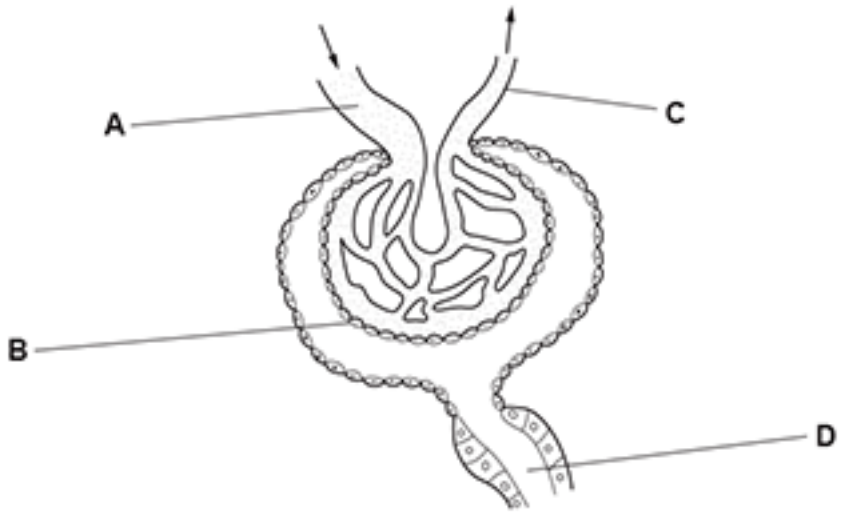
[2]

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38 The diagram shows part of a kidney tubule (nephron).



Which structure is the proximal convoluted tubule?

Your answer ☐ [1]

39 Urine produced after vigorous exercise is often much darker in colour than urine produced when at rest.

Which reason explains why urine becomes darker in colour?

A Increased sweating and decreased urea production.
B Decreased ADH production and increased urea production.
C Increased sweating and increased ADH production.
D Increased ADH production and decreased urea production.

Your answer ☐ [1]

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40 *Sodium ions help regulate the balance of water between the blood and body cells.

In some people the level of sodium ions in the blood can become very low. This can alter the balance of water between the blood and body cells. Doctors can prescribe drugs for patients who have this condition.

Explain how low sodium ion levels in the blood will affect the cells of the body and suggest why drugs that block the action of ADH can treat this condition.

[6]

41(a) Which hormone works with insulin to control blood sugar levels in the body?

Tick (✓) **one** box.

Gibberellin ☐

Glucagon ☐

Glucose ☐

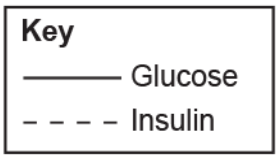
Glycogen ☐

[1]

(b) A glucose tolerance test can help identify diabetes.

The graphs show a glucose tolerance test in three people, A, B and C.

One person is healthy, and two people have different types of diabetes.



'The Child with a Metabolic Condition', Chapter 31, www.nursekey.com, Nurse Key.
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(i) Which person has **type 2** diabetes?

Person ---------- [1]

(ii) Explain the reasons for your choice in part **(i)**.

---

[2]

(c) Scientists are using human embryonic stem cells to grow cells to treat type 1 diabetes.

Explain why scientists use embryonic rather than adult stem cells.

---

[2]

42

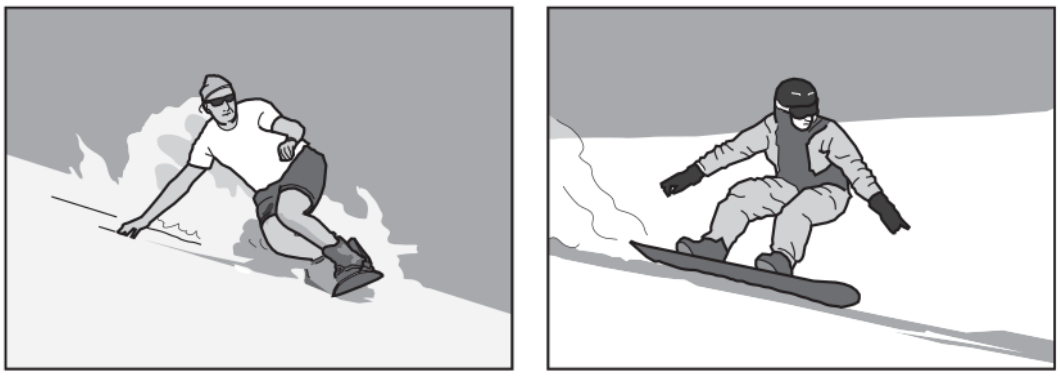
(i) Explain why overheating of the body may stop chemical reactions in cells.

---

[2]

(ii) * Look at **Fig. 20.2** which shows two people riding on boards.

Person A is riding a board on sand in a hot desert. **Person B** is riding a board on snow.



Person A **Person B**

Fig. 20.2

Explain the different problems of temperature regulation for these two people and give examples of the ways their bodies solve these problems.

[6]

43 Red blood cells burst when they are placed in a solution with a much higher water potential than the red blood cells. This is called lysis.

Explain why lysis happens.

[3]

44(a) **Fig. 22.1** shows the mass of urea in the urine plotted against the BMI (Body Mass Index) for nine boys. BMI is a value often used to see if a person is a healthy mass for their height.

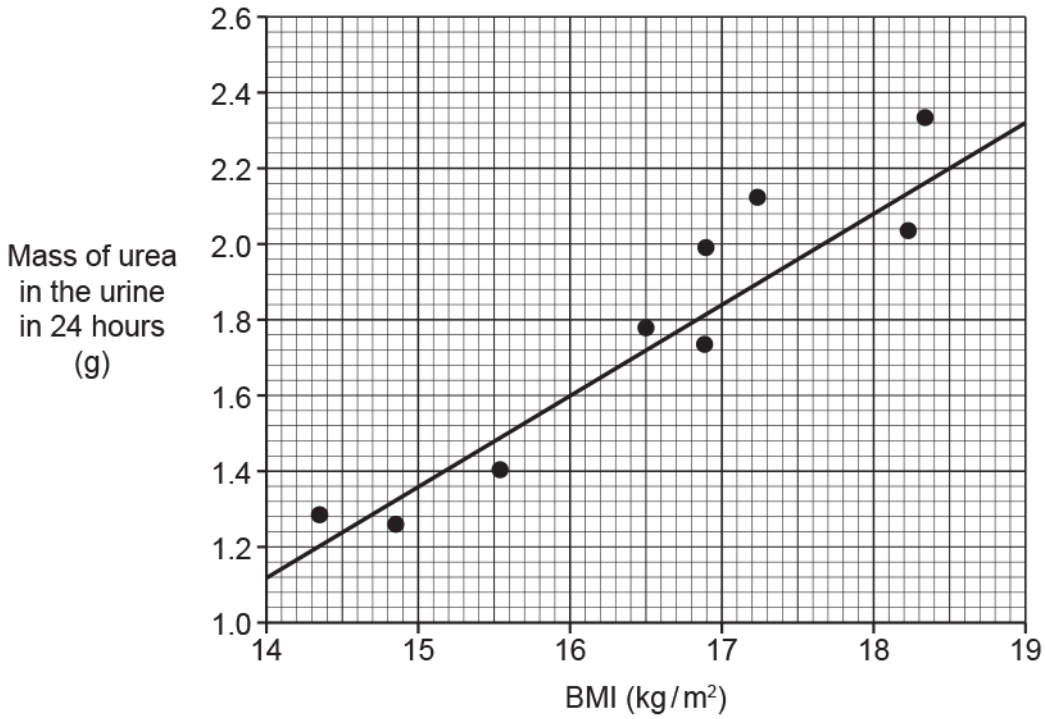


Fig. 22.1

(i) What does the graph show about the relationship between BMI and the mass of urea in the urine?

[1]

(ii) A boy has a BMI of 16. He produces 1000 cm^3 of urine in 24 hours.

Calculate the concentration of urea in the boy's urine.

Concentration = ...g / cm^3

[2]

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(iii) **Fig. 22.2** shows the mass of urea in the urine against the BMI for nine **different** boys.

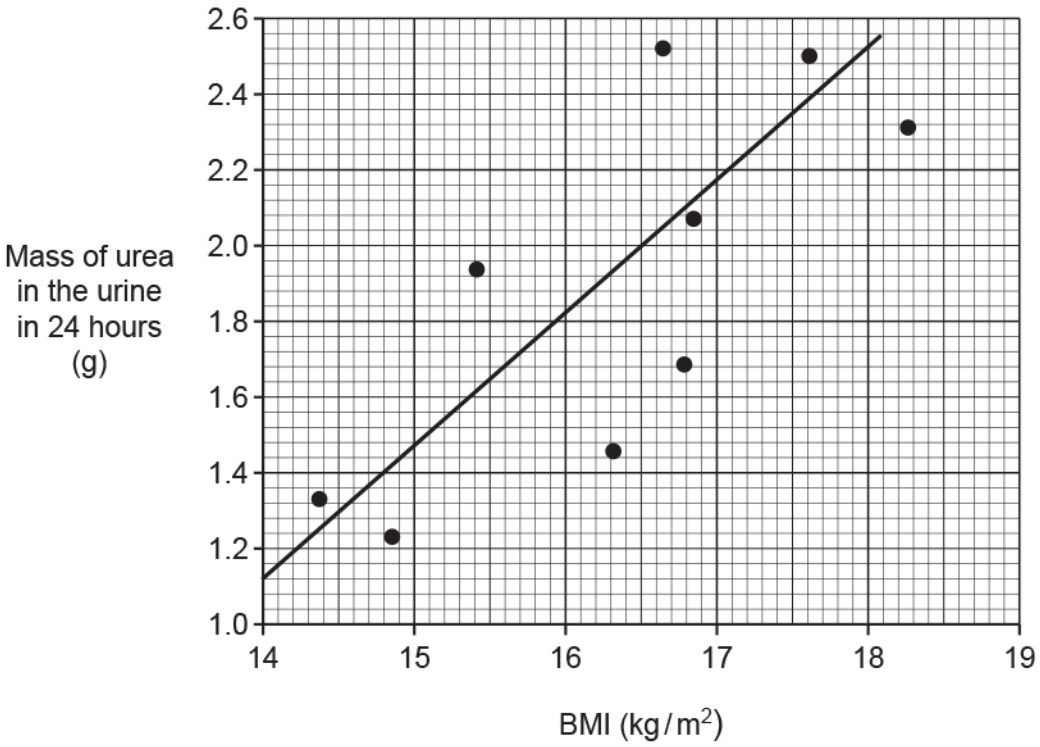


Fig. 22.2

Give **two** differences in the relationship between BMI and the mass of urea in the urine shown in **Fig. 22.1** and **Fig. 22.2**.

1 _____

_____

2 _____

_____

[2]

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(b) The kidney filters the blood. The fluid produced by filtering the blood passes through kidney tubules.

Each kidney tubule contains a number of different parts.

Put a number (**1** to **5**) in the boxes to show the order of the parts that the liquid passes through.

The first one has been done for you.

Bowman's capsule	**1**
Collecting duct	
Proximal convoluted tubule	
Loop of Henlé	
Second coiled region	

[3]

45 Zebras (**Fig. 23.1**) have evolved to live in hot grassland in Africa.

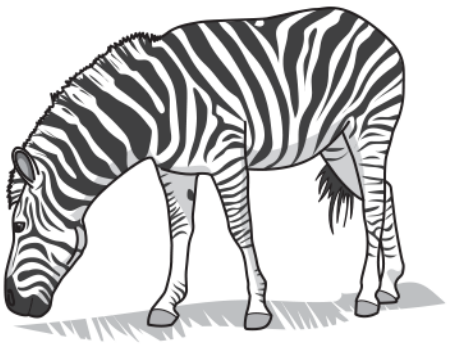


Fig. 23.1

Scientists have tried to find out why zebras have evolved stripes on their body.

One theory is that the stripes help to keep the zebra cooler than other colours. Scientists did an experiment to test this theory. They covered barrels of cold water with the skin of different animals. Then they measured the temperature of the water several hours later.

The results are shown in **Fig. 23.2.**

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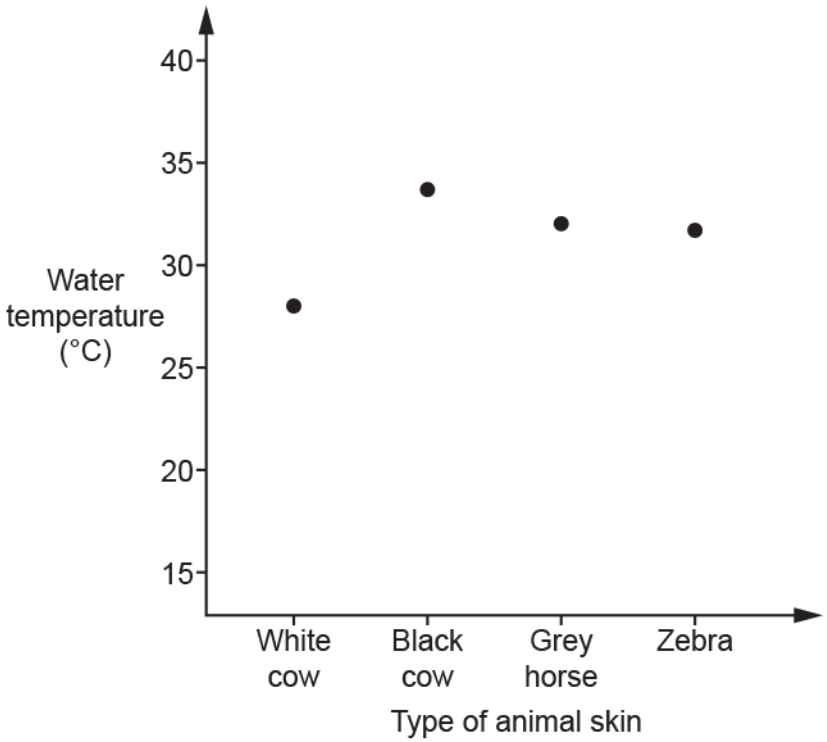


Fig. 23.2

(i) Do the results in **Fig. 23.2** support the theory that stripes keep zebras cool?
Explain your answer.

---

[1]

(ii) The scientists were aiming to investigate if it was **only** the colour of the skin that affected temperature regulation.

Suggest **one** improvement the scientists could make to ensure they **only** investigate the **colour** of the skin.
Explain your answer.

---

[1]

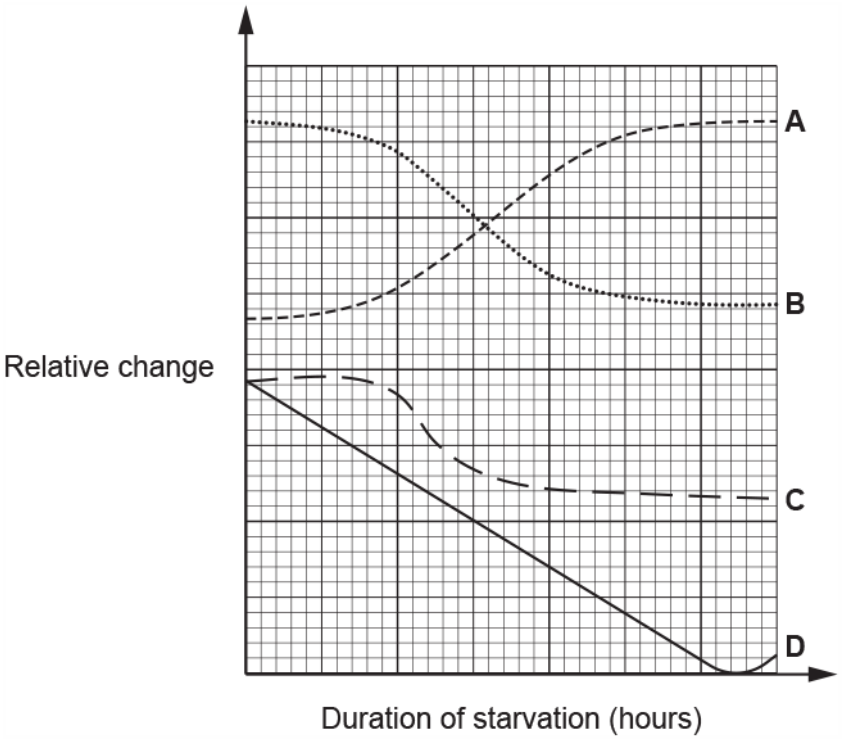
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46 Short-term starvation affects the levels of blood glucose, liver glycogen and the hormones insulin and glucagon.

Which line on the graph represents the level of glucagon in the blood during short-term starvation?



Your answer ☐ [1]

47 Red blood cells burst when they are placed in a solution with a much higher water potential than the red blood cells. This is called lysis.

Explain why lysis happens.

[3]

48(a) Fig. 17.1 shows the mass of urea in the urine plotted against the BMI (Body Mass Index) for nine boys. BMI is a value often used to see if a person is a healthy mass for their height.

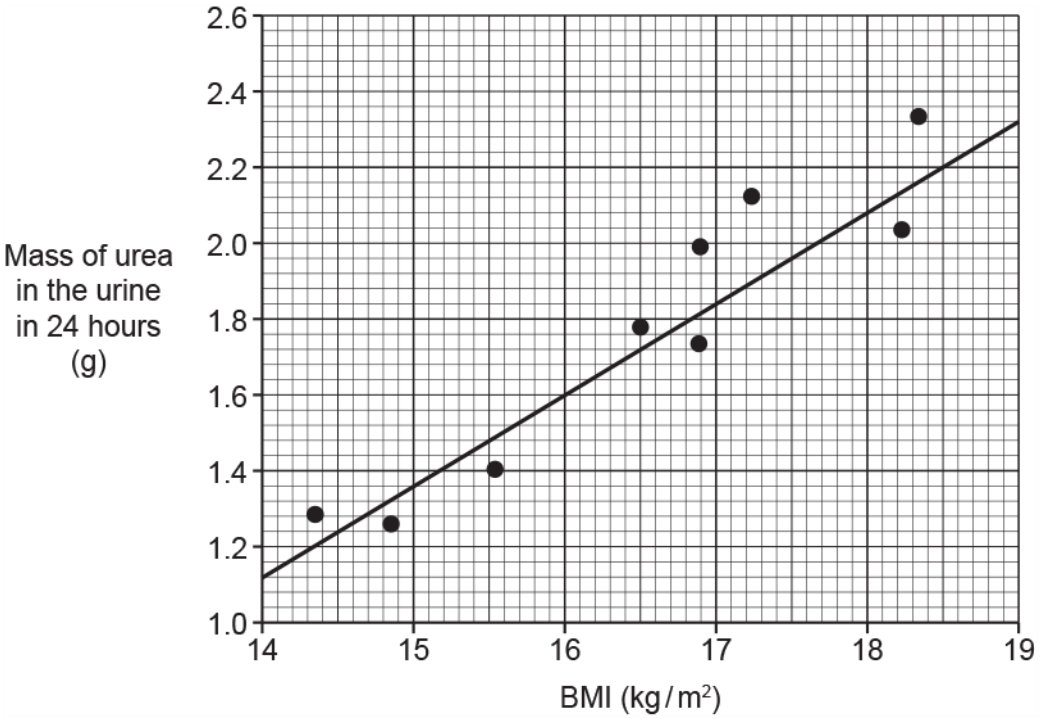


Fig. 17.1

(i) What does the graph show about the relationship between BMI and the mass of urea in the urine?

[1]

(ii) A boy has a BMI of 16. He produces 1000 cm^3 of urine in 24 hours.

Calculate the concentration of urea in the boy's urine.

Concentration = ... g / cm^3 [2]

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(iii) **Fig. 17.2** shows the mass of urea in the urine against the BMI for nine **different** boys.

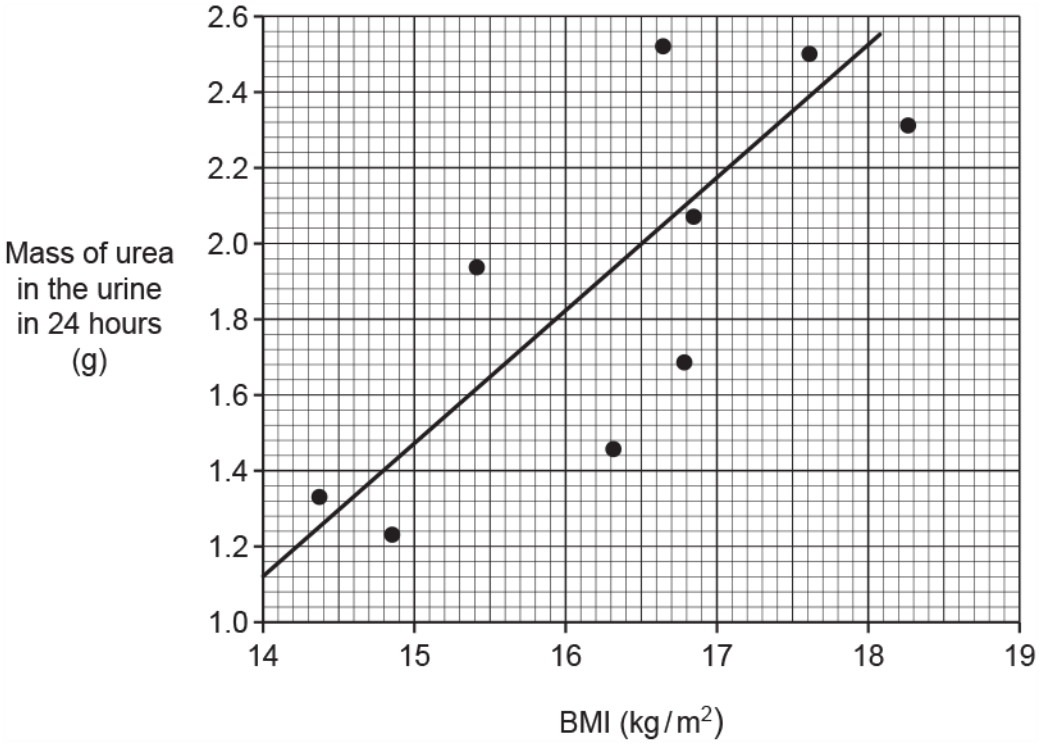


Fig. 17.2

Give **two** differences in the relationship between BMI and the mass of urea in the urine shown in **Fig. 17.1** and **Fig. 17.2.**

1 _____

_____

2 _____

_____

[2]

(b) The kidney filters the blood. The fluid produced by filtering the blood passes through kidney tubules.

Each kidney tubule contains a number of different parts.

Put a number (1 to 5) in the boxes to show the order of the parts that the liquid passes through.

The first one has been done for you.

Bowman's capsule	1
Collecting duct	
Proximal convoluted tubule	
Loop of Henlé	
Second coiled region	

[3]

49 Protein synthesis takes place inside cells.

ADH is a protein hormone made up of amino acids.

(i) Complete the sentences to explain the link between amino acids and proteins.

Large molecules, like proteins, made of smaller molecules are called .....

The smaller molecules, or amino acids, are called ..... .

[2]

(ii) Alcohol inhibits ADH production.

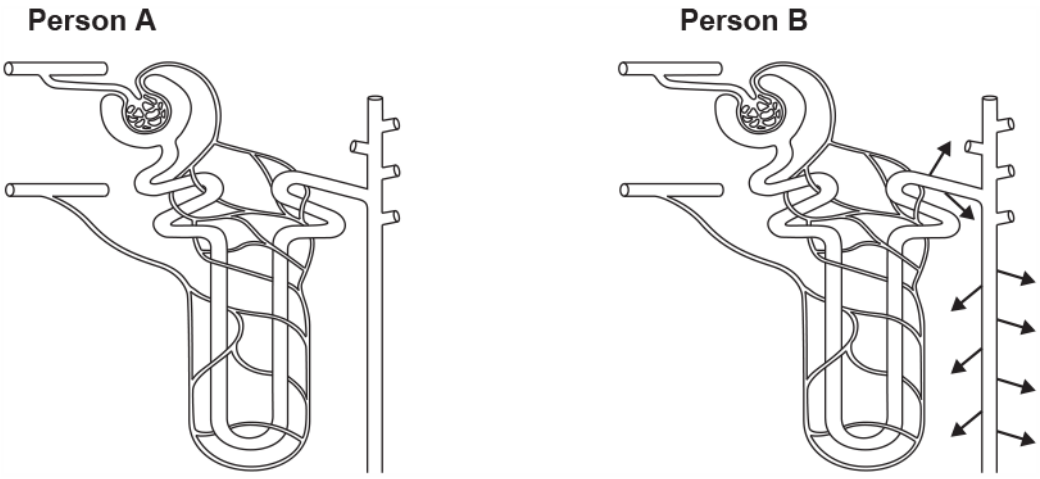
Person A and B both drank one small 100 ml drink.
Only one of the drinks was high in alcohol.

Look at the diagram of a kidney tubule in person A and B after the drink.

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→ Movement of water

Explain how you can tell from the diagram that person A's drink contained alcohol.

---

[2]

(iii) After the alcohol has been removed from person A's body, control mechanisms will correct the excess loss of water caused by the alcohol.
Describe these control mechanisms.

---

[2]

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50(a) Zebras (**Fig. 17.1**) have evolved to live in hot grassland in Africa.

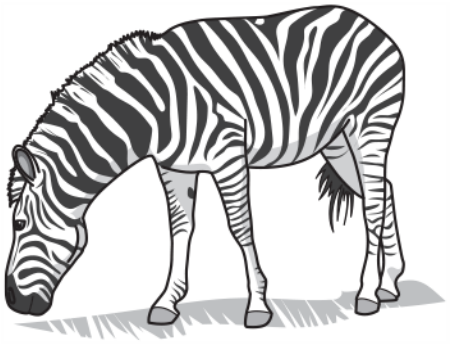


Fig. 17.1

Scientists have tried to find out why zebras have evolved stripes on their body.

One theory is that the stripes help to keep the zebra cooler than other colours. Scientists did an experiment to test this theory. They covered barrels of cold water with the skin of different animals. Then they measured the temperature of the water several hours later.

The results are shown in **Fig. 17.2**.

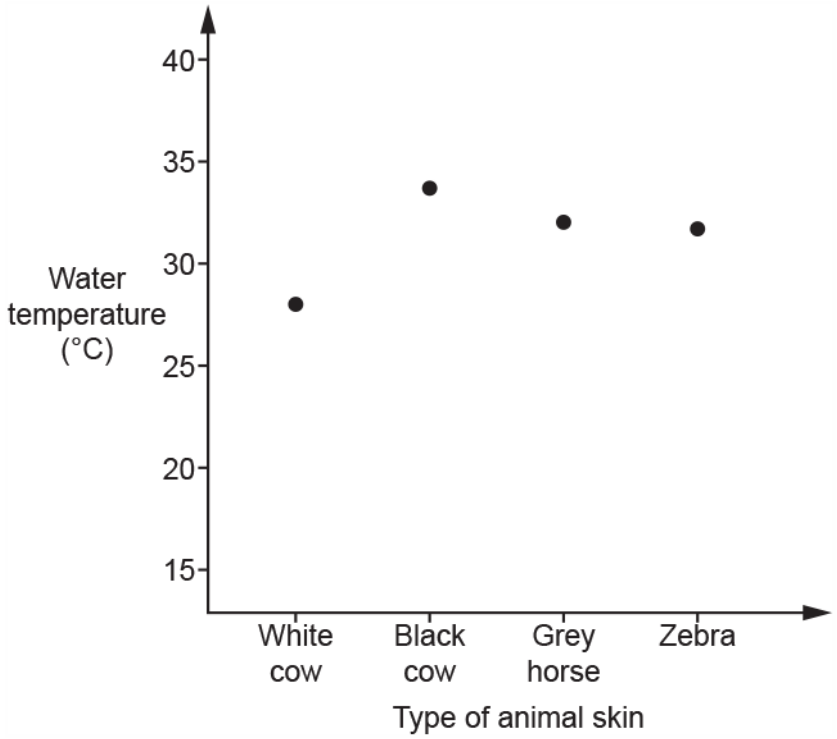


Fig. 17.2

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(i) Do the results in **Fig. 17.2** support the theory that stripes keep zebras cool?
Explain your answer.

---

[1]

(ii) The scientists were aiming to investigate if it was **only** the colour of the skin that affected temperature regulation.

Suggest **one** improvement the scientists could make to ensure they **only** investigate the **colour** of the skin.

Explain your answer.

---

[1]

(b) Another theory says that the stripes make a zebra less likely to be bitten by insects.

To test this theory scientists made models of zebras and covered them with sticky tape. One model was black. The other models had different widths of stripes.

Fig. 17.3 shows the number of insects that stuck to the tape.

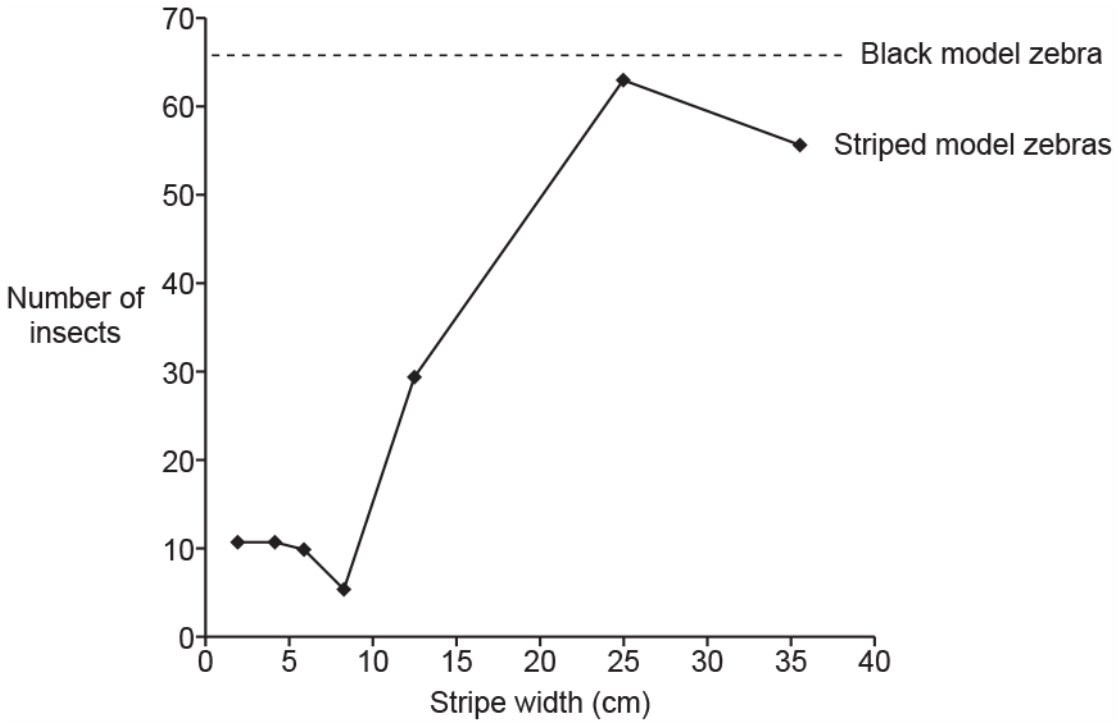


Fig. 17.3

(i) Describe what **Fig. 17.3** shows about the link between zebra stripes and protection from insects.

---

[2]

(ii) Horse blankets are used to cover horses when they are outside. Companies have started to produce horse blankets with zebra stripes.

Use the information in **Fig. 17.3** to suggest what width of stripe should be used to reduce insect bites.

Explain your answer.

---

[1]

(iii) Biting insects can spread pathogens between animals.

Use the theory of natural selection to explain how zebra stripes could have developed.

---

[3]

51 A chemical in stevia leaves makes them taste sweet. This chemical is **not** a sugar.
People with diabetes need to know if the food they eat contains sugar.

(i) Describe how you could test some stevia leaves to prove that they do **not** contain sugar.

Reagent used _____

Method _____

_____

Expected result _____

_____ [3]

(ii) Will using stevia in foods help people with type 2 diabetes?

Explain your answer.

_____

_____

_____

_____ [2]

END OF QUESTION PAPER