AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.5.2 THE HUMAN NERVOUS SYSTEM (PACK 3)

SCORE	PERCENTAGE
/120	%

STEMUP

These questions belong to AQA, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by AQA. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with AQA and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. AQA has not endorsed, approved or been involved in the production of it. AQA and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

AQA publishes its past papers, mark schemes and examiner reports. Always check the current specification at aqa.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Q1.

(a) Give **three** receptors which a mouse might use to detect food under natural conditions.

1. _____

_____

2. _____

_____

3. _____

_____

(3)

(b) Whilst observing mouse behaviour, a student drops a pen near the mouse's cage. The mouse jumps at the noise.

Describe, as fully as you can, the processes by which the mouse responds to the stimulus of the dropped pen.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(6)

(Total 9 marks)

Q2.

The doctor is testing the child's nervous system by tapping the tendon just below the knee.

This pulls cells which are sensitive to stretching.

STEMUP.CO.UK



(a) What are cells which are sensitive to stimuli called?

_____

(1)

(b) These cells send information to the spinal cord.

In what form is this information sent?

_____

_____

(2)

(c) The healthy response to the stimulus is the straightening of the leg.

What is the effector in this response?

_____

(1)

(d) This response is one example of a reflex action.

Describe **one other** example of a reflex action in terms of:

stimulus → *receptor* → *coordinator* → *effector* → *response*

_____

_____

_____

_____

_____

_____

(5)

(Total 9 marks)

STEMUP.CO.UK

Q3.

A dog runs across the road in front of a car. The driver slams her foot on the brakes.

(i) Explain how the nervous system brings about this response.

_____

_____

_____

_____

_____

_____

_____

(4)

(ii) Explain why alcohol consumption would affect the driver's response.

_____

_____

(1)

(Total 5 marks)

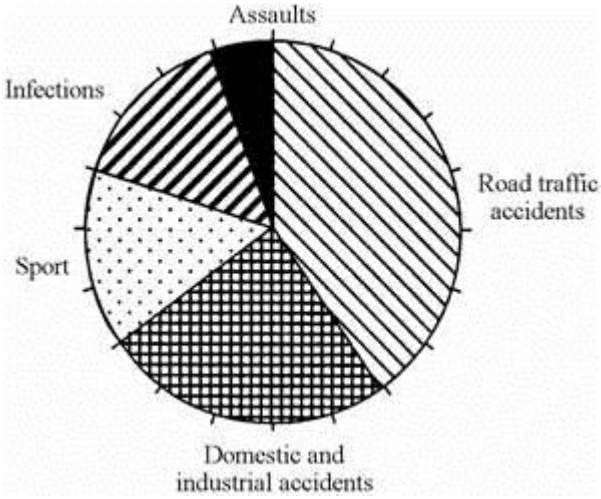
Q4.

Every year at least 700 people in Britain break their back or their neck. This damages the spinal cord and may result in permanent paralysis.



(a) The pie chart shows the causes of damage to the spinal cord.

STEMUP.CO.UK



(i) Which is the commonest cause of damage to the spinal cord?

_____

(1)

(ii) Calculate the proportion of injuries to the spinal cord caused by sport.

Proportion _____

(1)

(b) Explain why a man with a damaged spinal cord cannot feel a pin stuck in his toe.

_____

_____

_____

_____

_____

_____

_____

_____

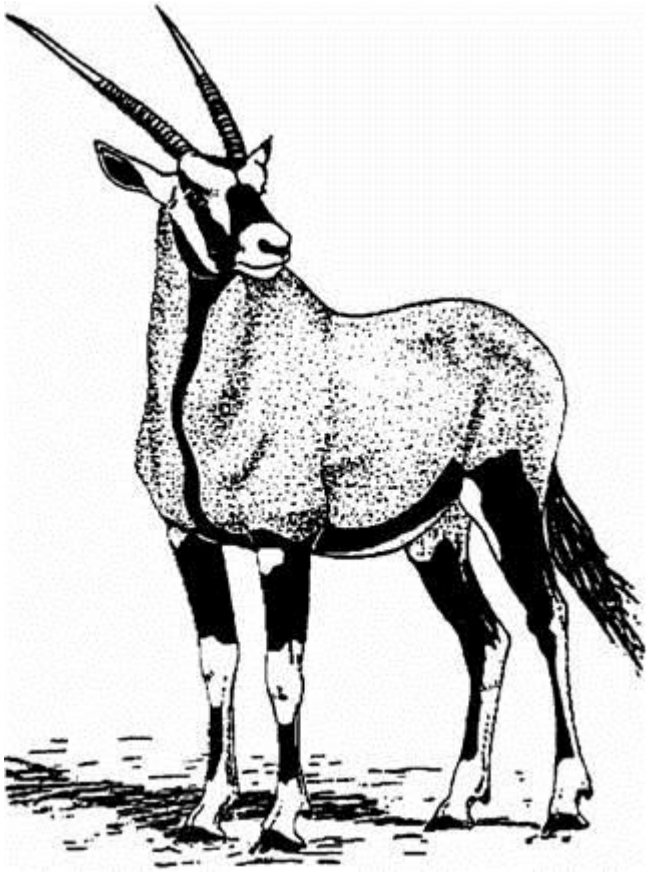
(3)

(Total 5 marks)

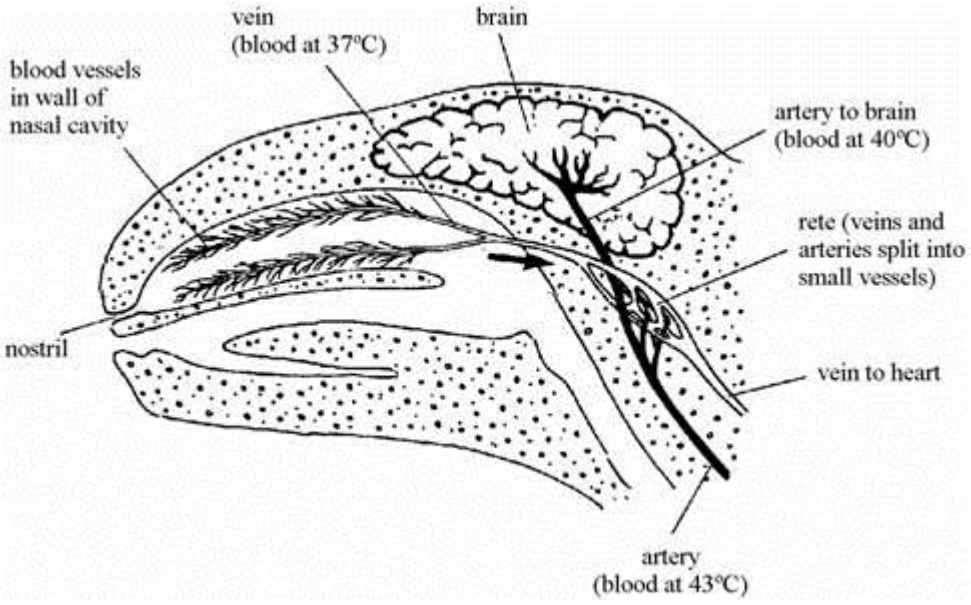
Q5.

The gemsbok is a large herbivore that lives in herds in desert areas of South Africa. Gemsboks feed on plants that are adapted to living in dry conditions. There are not many rivers, lakes or ponds that can provide drinking water for the animals. The desert areas are hot during the day but cool at night. As the air cools at night it becomes moist, and the plants absorb the moisture.

STEMUP.CO.UK



Although the gemsbok lives in hot conditions, it does not sweat. During the day its body temperature can rise, but it is important that blood reaching the brain does not rise above 40°C. The drawing shows how the blood system is adapted to cool the blood which flows to the brain.



(i) Suggest an advantage to the gemsbok of **not** sweating.

_____

_____

(1)

STEMUP.CO.UK

(ii) Explain how the blood is cooled in the cavities of the nose.

_____

_____

_____

_____

(2)

(iii) How does the structure of the rete help in keeping the brain cool?

_____

_____

_____

_____

(2)

(Total 5 marks)

Q6.

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 cm^3 of water.
1500 cm^3 came directly from drinking.
Give **two** other ways in which the body may gain water.

STEMUP.CO.UK

1. _____

2. _____

(2)

(Total 6 marks)

Q7.

(a) Fill in the table about receptors. The first answer has been done for you.

RECEPTORS IN THE	SENSITIVE TO
Eyes	Light
Skin	
	Sound
Tongue	

(3)

(b) Describe, in as much detail as you can, how information is transmitted from light receptors in the retina to the brain.

_____

_____

_____

_____

(3)

(Total 6 marks)

Q8.

(a) Explain how sweating helps to keep our body temperature relatively constant.

_____

_____

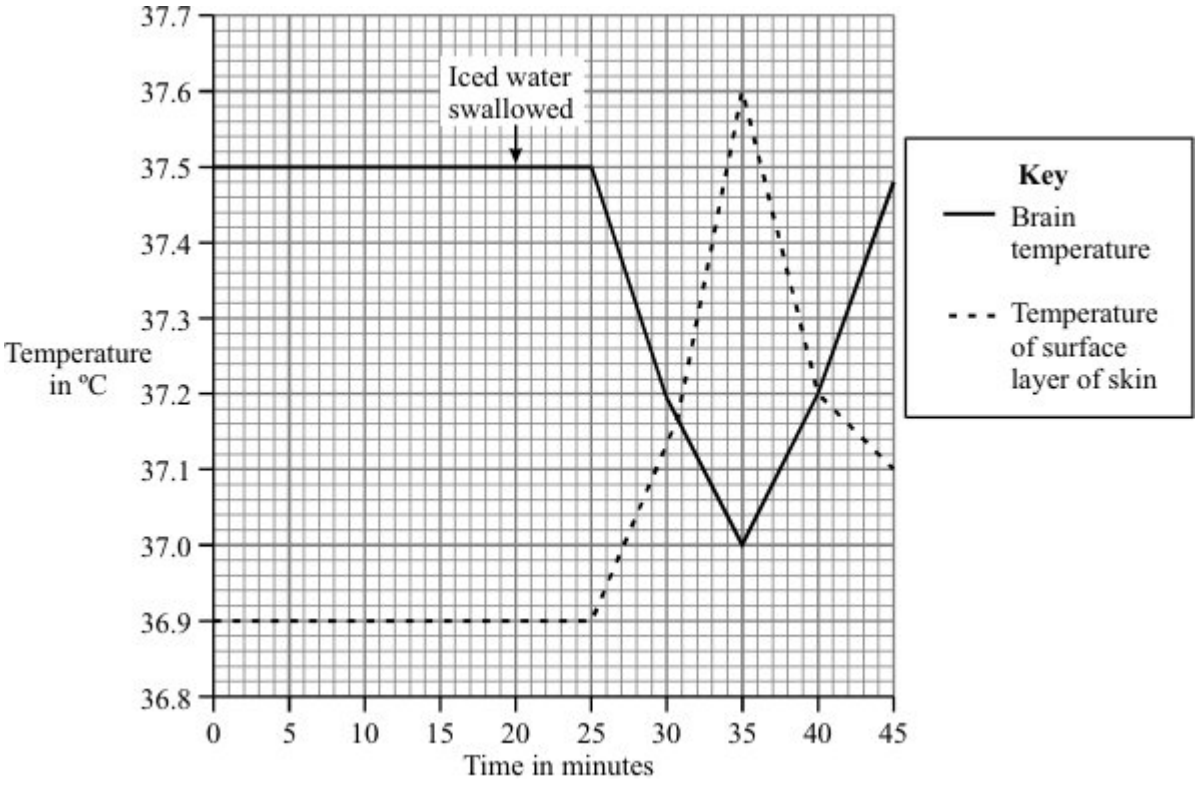
_____

_____

(2)

(b) In an experiment, a student swallowed some iced water. The graph shows how this affected the student's skin temperature and brain temperature.

STEMUP.CO.UK



(i) Explain why the temperature of the brain changed after the student swallowed the iced water.

_____

_____

_____

_____

(2)

(ii) This change in brain temperature led to a change in the temperature of the surface layer of the skin.

Explain how this happened.

_____

_____

_____

_____

_____

_____

(3)

(Total 7 marks)

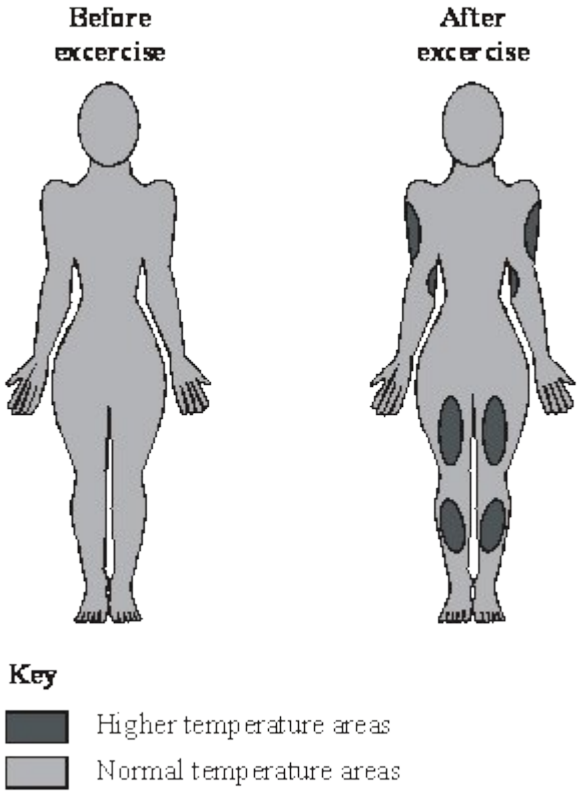
STEMUP.CO.UK

Q9.

The temperature at the surface of the skin can be measured by using a technique called thermography.

In this technique, areas with higher temperature appear as a different colour on the thermographs.

The drawings below show the results of an investigation in which thermographs were taken from a person before and after exercise.



Describe and explain, as fully as you can, the effects of exercise on skin temperature.

_____

_____

_____

_____

_____

_____

_____

_____

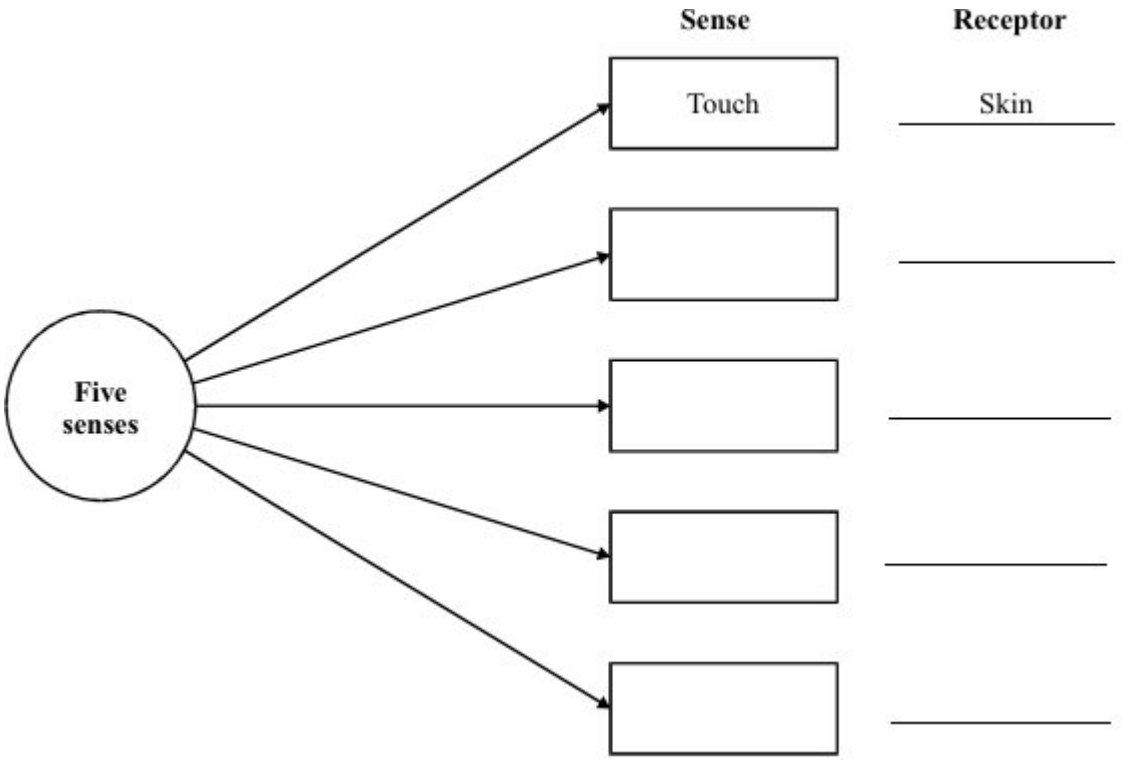
(Total 3 marks)

Q10.

STEMUP.CO.UK

(a) Humans have a number of senses, for example touch. Senses are detected by receptors, for example skin detects touch.

In the boxes write the names of **four** other senses. By each box write the name of the receptor.



(8)

(b) When your hand is touched, the information is passed to your brain. Describe how the information gets from your skin to your brain.

_____

_____

_____

_____

(2)

(Total 10 marks)

Q11.

Describe how the brain is informed of the image detected by the retina.

_____

_____

_____

_____

STEMUP.CO.UK

_____

(Total 3 marks)

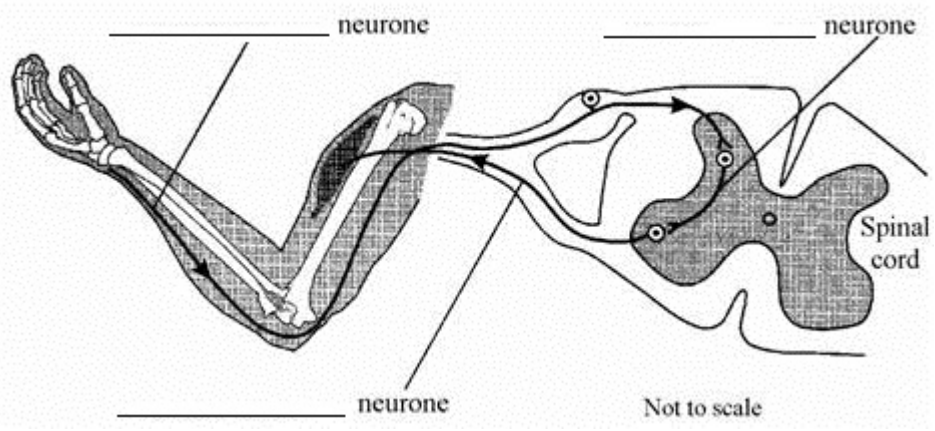
Q12.

(a) What is the name of the organ which controls the nervous system?

_____

(1)

(b) The diagram shows a reflex arc. Label the **three** neurones.



(3)

(c) Snatching your hand from a hot object is an example of a reflex action. Give **one** other example of a reflex action.

_____

(1)

(d) Describe the stages that happen in a reflex action.

_____

_____

_____

_____

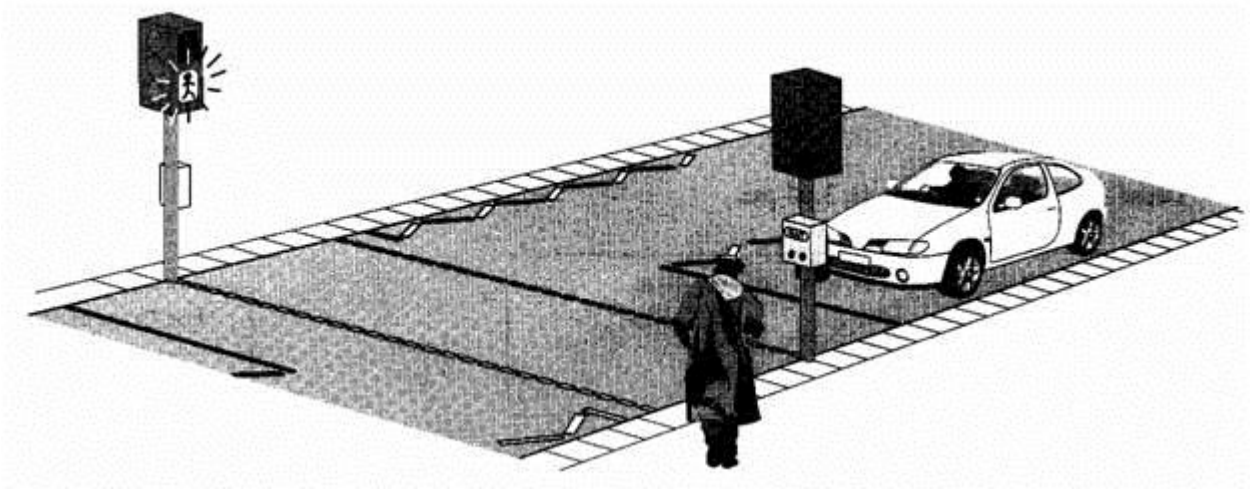
(3)

(Total 8 marks)

Q13.

A man is walking along a street. He plans to cross the road at the pelican crossing. Pelican crossings show a flashing green person and bleep when it is safe to cross.

STEMUP.CO.UK



(a) State **two** different ways the man uses:

(i) his eyes, to help him cross the road safely;

1. _____

2. _____

(2)

(ii) his ears, to help him cross the road safely.

1. _____

2. _____

(2)

(b) (i) Eyes, ears and skin contain sense receptors.

State the names of **two** other parts of the body which contain sense receptors.

_____ and _____

(2)

(ii) What type of sense receptor is in the skin of his feet?

_____

(1)

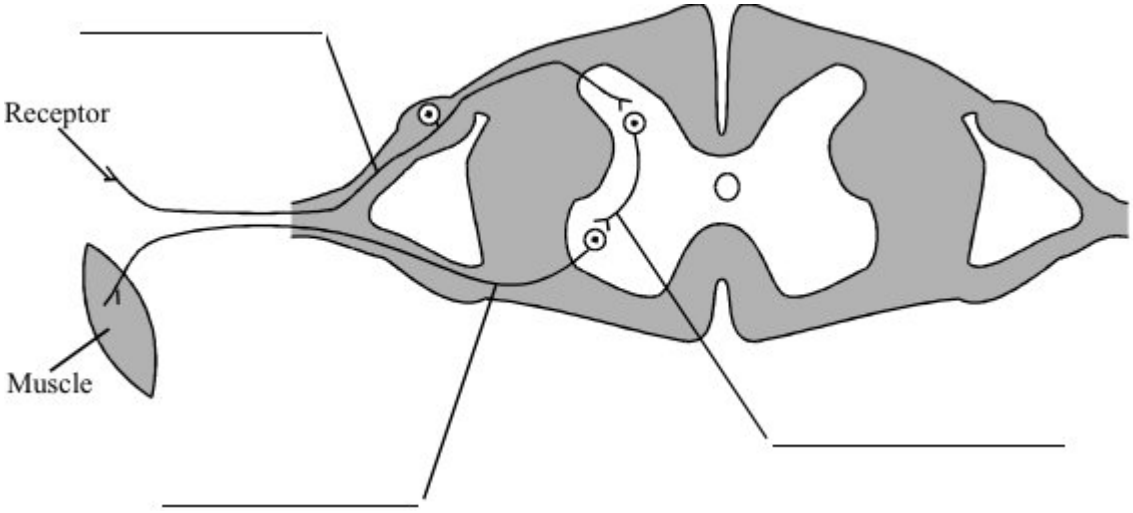
(Total 7 marks)

Q14.

Information is also passed by impulses in the nervous system. Neurones carry impulses very rapidly. The diagram shows a reflex arc.

Label the diagram by adding the names of the neurones.

STEMUP.CO.UK

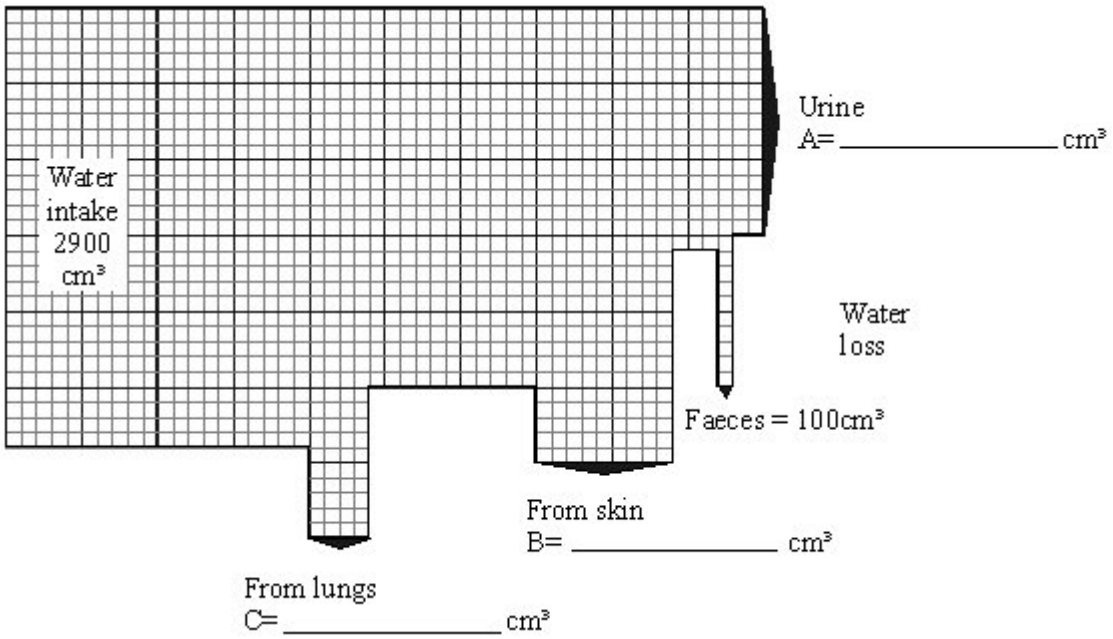


(Total 3 marks)

Q15.

The diagram shows the amount of water lost by an adult in one day.

The width of the arrows shows how much water is lost in each way.



(a) Work out from the diagram the water loss for urine, skin and lungs and write the correct figures in the spaces on the diagram.

(4)

(b) When it is hot, much more water is lost from the skin. Which other method of water loss would also change significantly?

Explain your answer.

_____

_____

STEMUP.CO.UK

_____

_____

_____

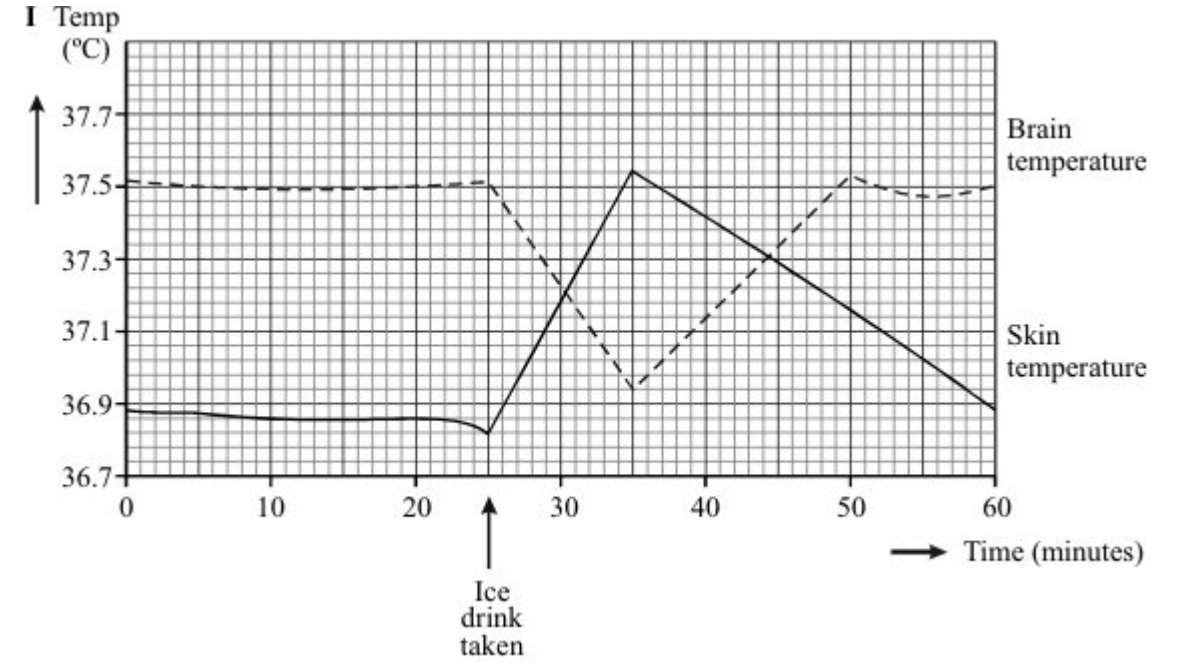
(3)

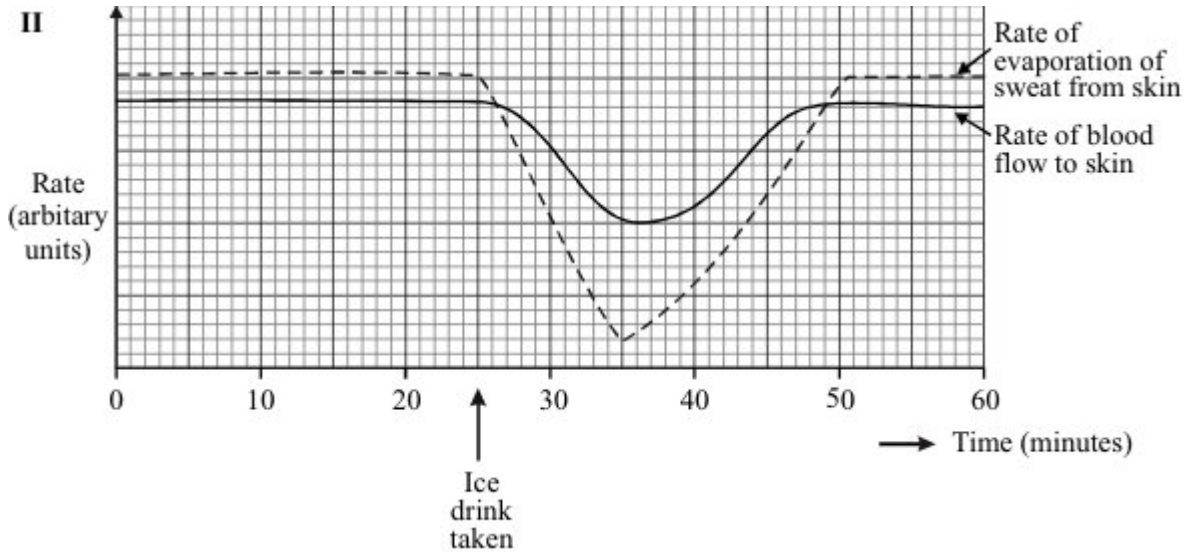
(Total 7 marks)

Q16.

On a hot day, a student has an iced drink.

Graphs I and II show some of the changes to the student's body produced by the iced drink.





Use the information from the graphs to explain, as fully as you can, why the temperature of the student's skin rises after she has taken the iced drink.

_____

STEMUP.CO.UK

_____

_____

_____

_____

_____

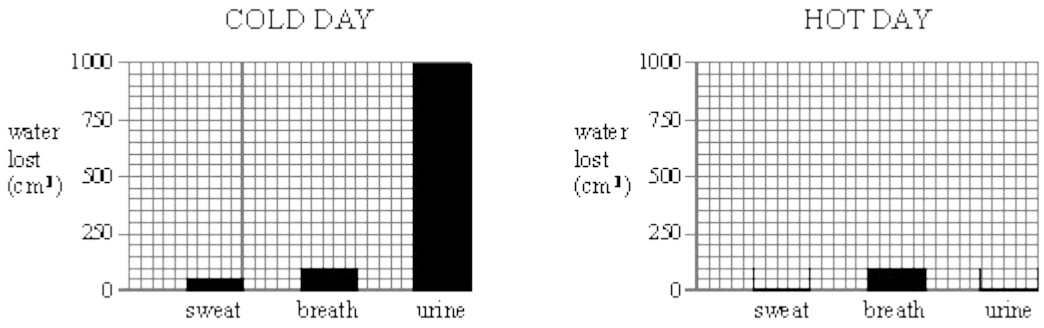
(Total 4 marks)

Q17.

The table shows how much water is lost from a boy's body on a cold day and on a hot day.

WATER LOST (cm^3)	COLD DAY	HOT DAY
in sweat	50	300
in breath	100	100
in urine	1000	750

(a) Use the figures in the table to complete the bar-chart for a hot day.



(2)

(b) How do the figures for the hot day compare with those for the cold day? Answer in as much detail as you can.

_____

_____

_____

_____

(4)

(c) The boy does the same things for the same amount of time on both days. Explain why the amounts of water lost in sweat and urine change.

Sweat _____

_____

STEMUP.CO.UK

Urine _____

_____

(2)

(Total 8 marks)

Q18.

The table shows how much water is lost from a boy's body on a cold day and on a hot day.

WATER LOST (cm^3)	COLD DAY	HOT DAY
in sweat	50	300
in breath	100	100
in urine	1000	750

(a) How do the figures for the hot day compare with those for the cold day? Answer in as much detail as you can.

_____

_____

_____

_____

_____

(2)

(b) The boy does the same things for the same amount of time on both days.

Explain why the amounts of water lost in sweat and urine change.

Sweat _____

_____

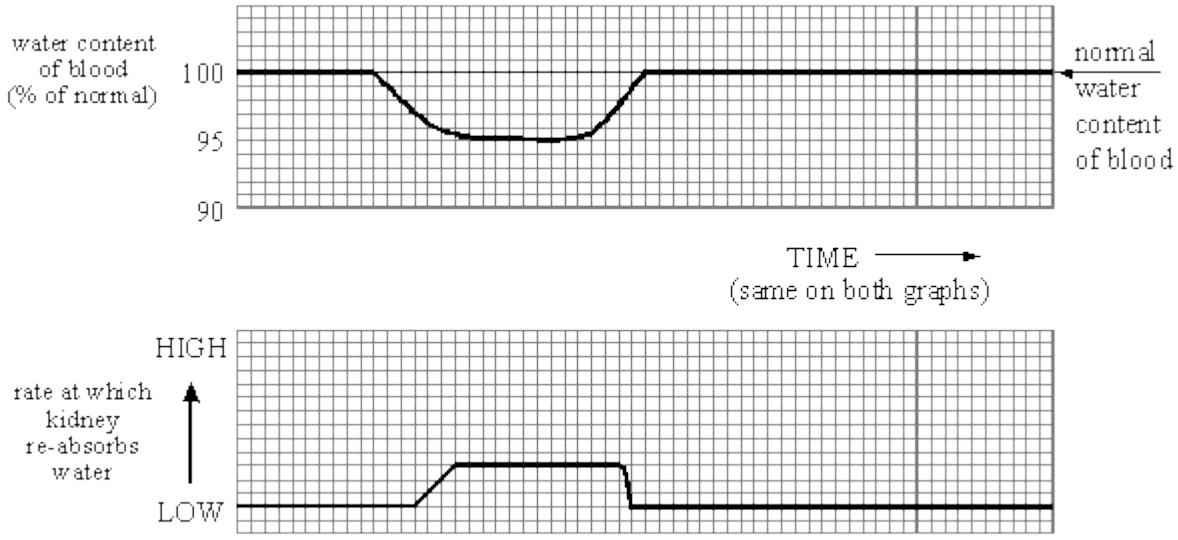
Urine _____

_____

(2)

(c) The rate at which the kidney re-absorbs water depends on the percentage of water in the blood.

STEMUP.CO.UK



Describe, as fully as you can, what the graphs tell you.

_____

_____

_____

_____

(4)

(d) How does your body control the rate at which your kidney re-absorbs water?

_____

_____

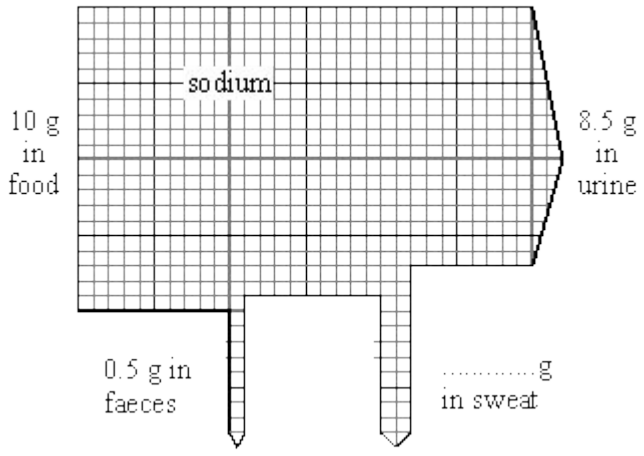
(2)

(Total 10 marks)

Q19.

To stay healthy, the amount of sodium in your body must not change very much.

On average, a girl takes in 10 grams of sodium a day in the food she eats.
The diagram shows what happens to this sodium.



STEMUP.CO.UK

(a) Add the missing figure to the diagram.

(1)

(b) Choose words from this list to complete the sentences below.

bladder **kidneys** **lungs** **skin**

Sweat is produced by the girl's _____

Urine is produced by the girl's _____

(2)

(c) The girl goes on holiday to a very hot place.
Her diet stays the same but she now loses 12 g of sodium each day in sweat.

(i) How will this affect the amount of sodium she loses each day in her urine?

_____

(1)

(ii) What should the girl do to make sure that her body still contains enough sodium?

_____

(1)

(Total 5 marks)

STEMUP.CO.UK