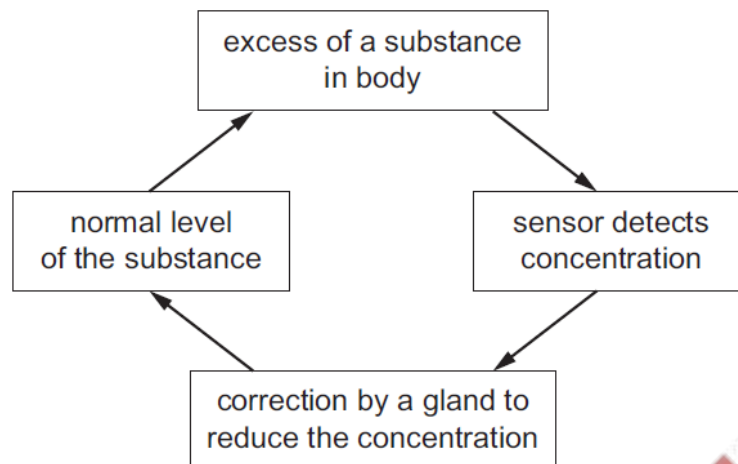


1. **Nov/2021/Paper_11/No.20**

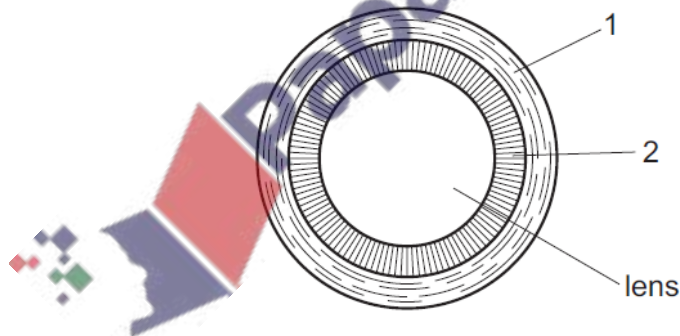
Which biological process is represented in the diagram?



- A antagonistic action
- B dialysis
- C negative feedback
- D reflex action

2. **Nov/2021/Paper_11/No.21**

The diagram shows a front view of the parts of the eye involved in producing a focused image of near and distant objects.

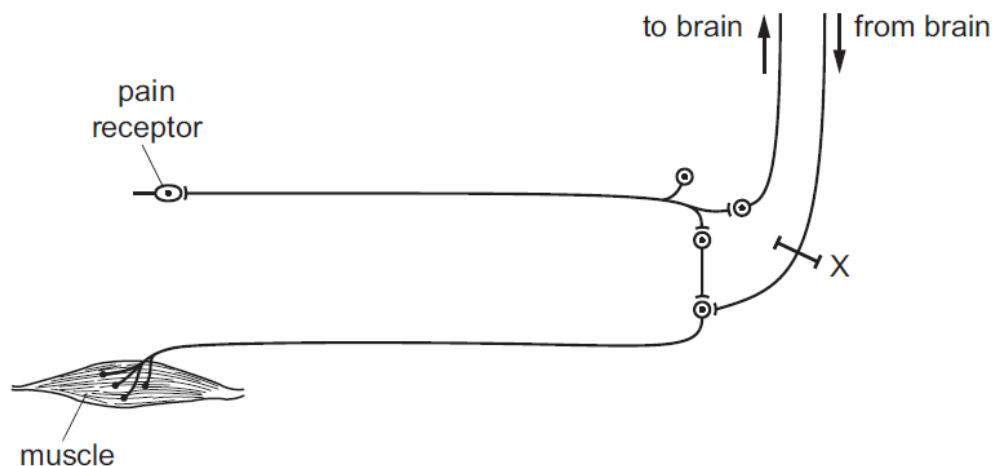


What are structures 1 and 2?

| | structure 1 | structure 2 |
|----------|----------------------|----------------------|
| A | ciliary muscles | suspensory ligaments |
| B | iris | pupil |
| C | pupil | iris |
| D | suspensory ligaments | ciliary muscles |

3. Nov/2021/Paper_11/No.22

The diagram shows some of the nerve pathways associated with a reflex action.



If the pathway at X is damaged, how does this affect the reflex?

- A The person will not be aware that the reflex is occurring.
- B The reflex cannot be controlled consciously.
- C The response will occur without any stimulus.
- D There is no response to the stimulus.

4. Nov/2021/Paper_11/No.23

Which statements about hormones are correct?

- 1 Insulin is made in the pancreas and increases the concentration of glucose in the blood.
- 2 Adrenaline lowers the amount of glucose in the blood after a meal.
- 3 Insulin is used to treat people with diabetes mellitus.

- A 1, 2 and 3 B 1 and 2 only C 2 only D 3 only

5. Nov/2021/Paper_11/No.25

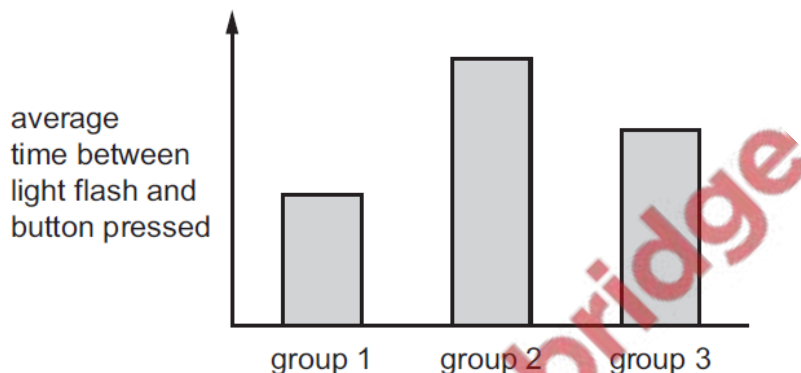
An investigation into reaction times involved three similar large groups of adults. Each adult had to press a button as soon as they saw a light flash. The time between the light coming on and the button being pressed was measured.

Group 1 did the task 30 minutes after smoking a cigarette.

Group 2 did the task 30 minutes after drinking 2 units of alcohol.

Group 3 was the control group. The control group did not smoke or drink alcohol.

The graph shows the results of this investigation.



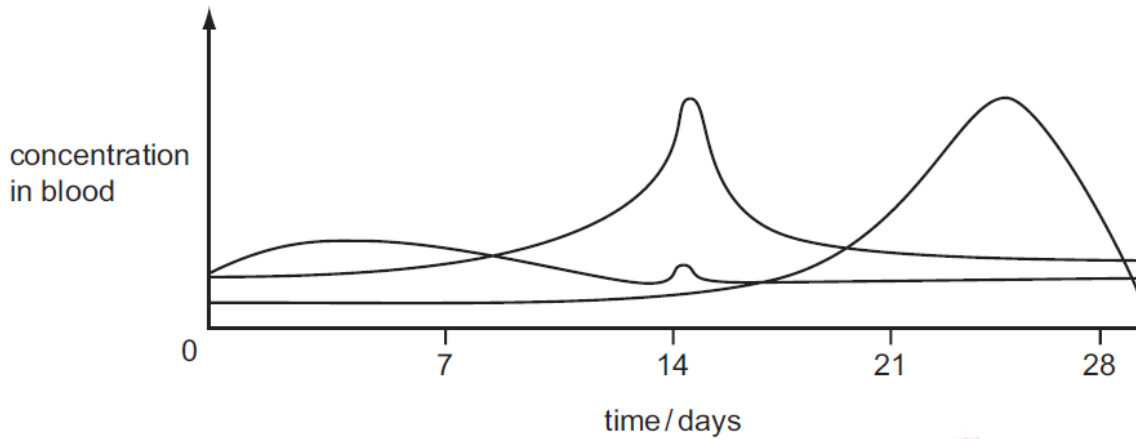
What is the best conclusion from the data?

- A Nicotine is a depressant and alcohol is a stimulant.
- B Nicotine reduces reaction times and alcohol increases reaction times.
- C Nicotine makes reactions slower and alcohol makes reactions faster.
- D Nicotine and alcohol are both addictive.



6. Nov/2021/Paper_11/No.35

The graph shows the concentration in the blood of three of the four hormones FSH, LH, oestrogen and progesterone during a menstrual cycle.



Which hormone is **not** shown?

- A FSH
- B LH
- C oestrogen
- D progesterone

7. Nov/2021/Paper_12/No.20

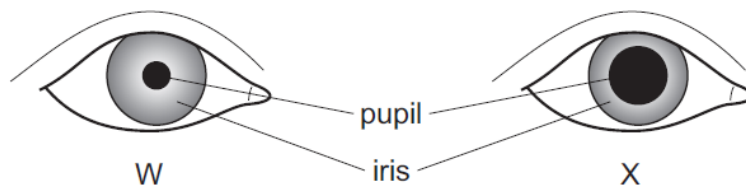
After exercise, human body temperature often rises above normal.

What will help to return the temperature to normal?

- A an increase in the fat layer under the skin
- B a hormonal response causing shivering
- C a positive feedback mechanism
- D dilation of blood vessels in the skin

8. Nov/2021/Paper_12/No.21

The diagrams show the front view of the pupil and iris of the eye in different light intensities.

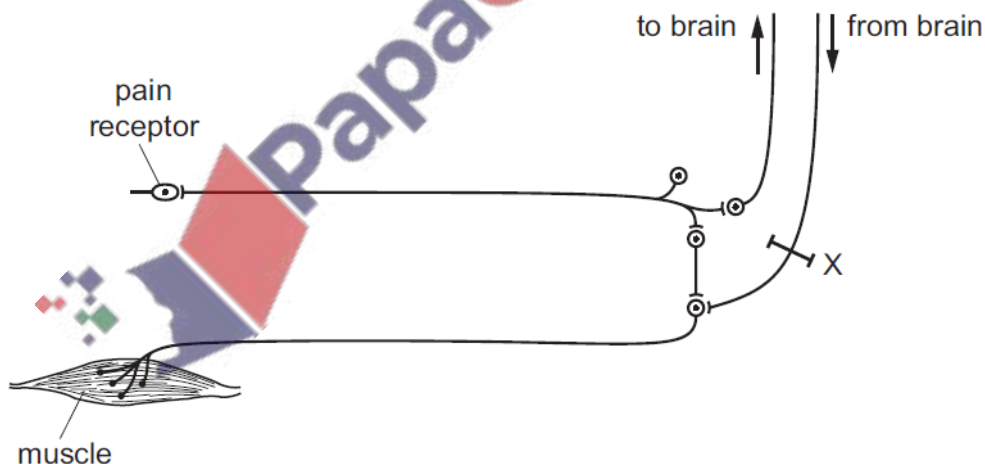


Which row correctly describes diagram X?

| | eye is in | circular muscles of the iris are | radial muscles of the iris are |
|---|--------------|----------------------------------|--------------------------------|
| A | bright light | relaxed | contracted |
| B | bright light | contracted | relaxed |
| C | dim light | relaxed | contracted |
| D | dim light | contracted | relaxed |

9. Nov/2021/Paper_12/No.22

The diagram shows some of the nerve pathways associated with a reflex action.



If the pathway at X is damaged, how does this affect the reflex?

- A The person will not be aware that the reflex is occurring.
- B The reflex cannot be controlled consciously.
- C The response will occur without any stimulus.
- D There is no response to the stimulus.

10. Nov/2021/Paper_12/No.23

What occurs after an injection of insulin?

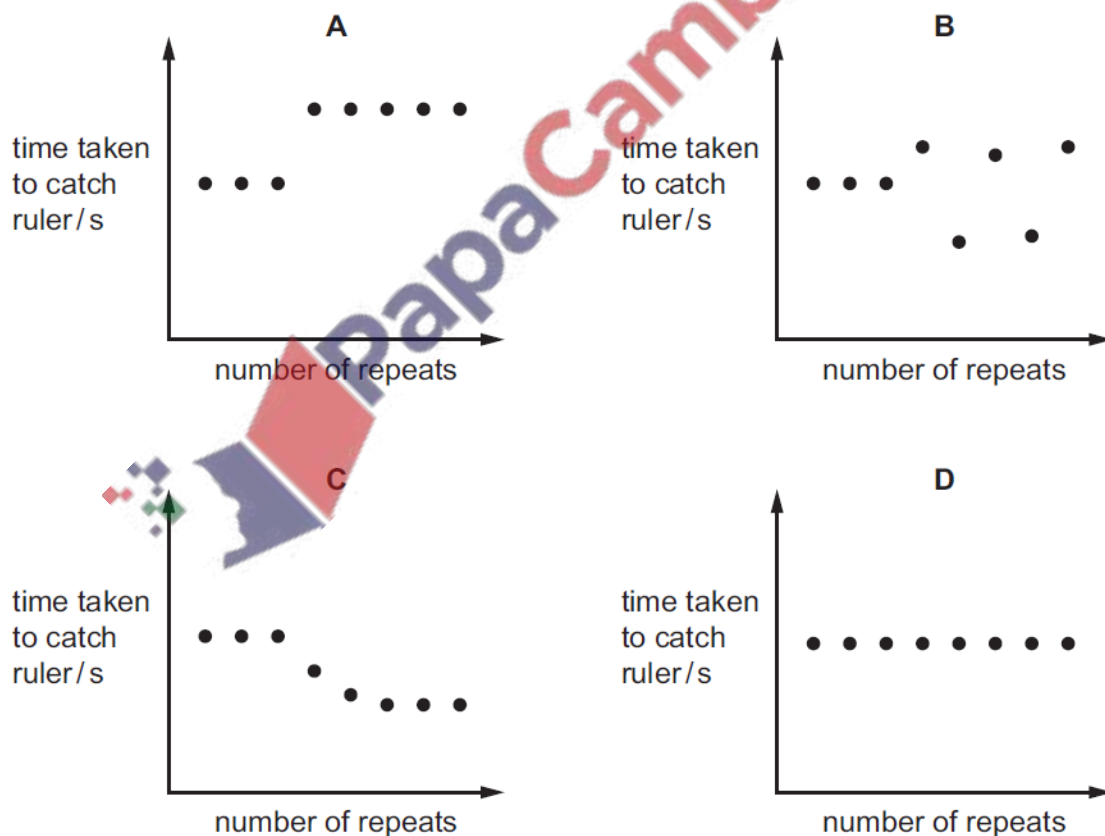
- A More adrenaline is released into the blood.
- B More glycogen is released from the liver.
- C The blood glucose concentration increases.
- D The production of glycogen increases.

11. Nov/2021/Paper_12/No.25

In an experiment, a person tested their reactions by measuring the time taken to catch a ruler that was dropped by another person.

They then repeated the test some time after drinking alcohol.

Which graph shows their results?



A man is cooking in a hot kitchen and sweat is being released by sweat glands in his skin.

(a) (i) Explain the term homeostasis with reference to sweating.

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..... [2]

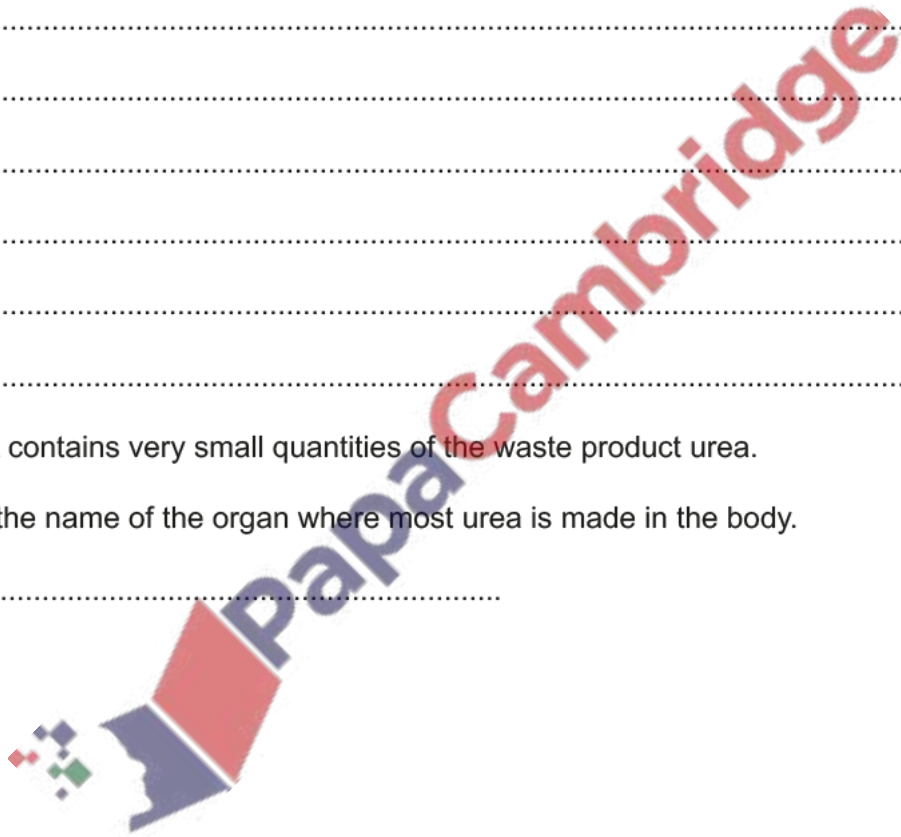
(ii) Explain how receptors and blood vessels in the man's skin are also involved in homeostasis when he is in the hot kitchen.

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(b) Sweat contains very small quantities of the waste product urea.

State the name of the organ where most urea is made in the body.

..... [1]



- (c) The table shows the concentrations of some chemicals found in the sweat, urine and blood plasma of a healthy human.

| chemical | concentration of chemical / mmol per dm ³ | | |
|----------|---|-------|--------------|
| | sweat | urine | blood plasma |
| urea | 22 | 393 | 6 |
| sodium | 66 | 110 | 141 |
| chloride | 59 | 103 | 99 |

- (i) Use the data in the table to compare the chemical composition of urine and blood plasma.

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..... [4]

- (ii) A patient has kidney disease and is about to start dialysis treatment.

Suggest and explain the concentration of urea in the sweat of the patient compared to that of a person who does not have kidney disease.

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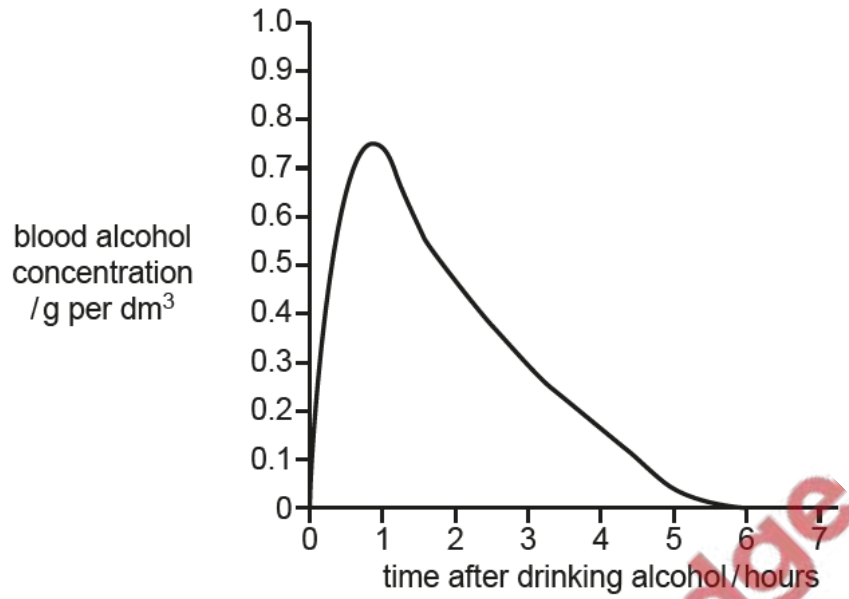
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[Total: 14]

The graph shows how blood alcohol concentration changes after a person drinks alcohol.



- (a) Suggest how the shape of the graph can be explained by what happens in parts of the body after drinking alcohol.

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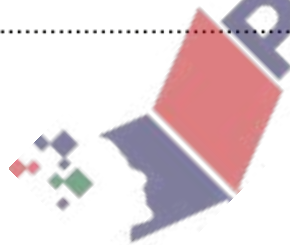
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..... [4]



(b) The graph shows that the highest blood alcohol concentration for this person after drinking alcohol is 0.75g per dm^3 .

Suggest **two** reasons why the highest blood alcohol concentration may be different for two people after drinking the same volume of alcohol.

1

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2

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[2]

(c) Describe the short-term effects of a high blood alcohol concentration.

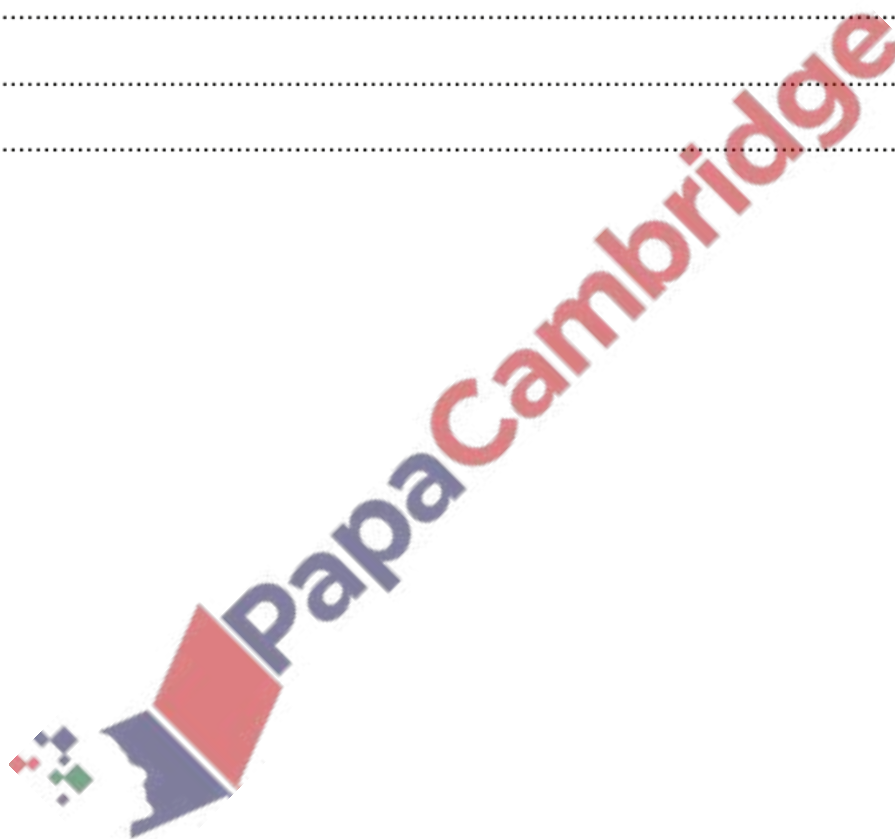
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[3]

[Total: 9]



(a) Define the term *drug*.

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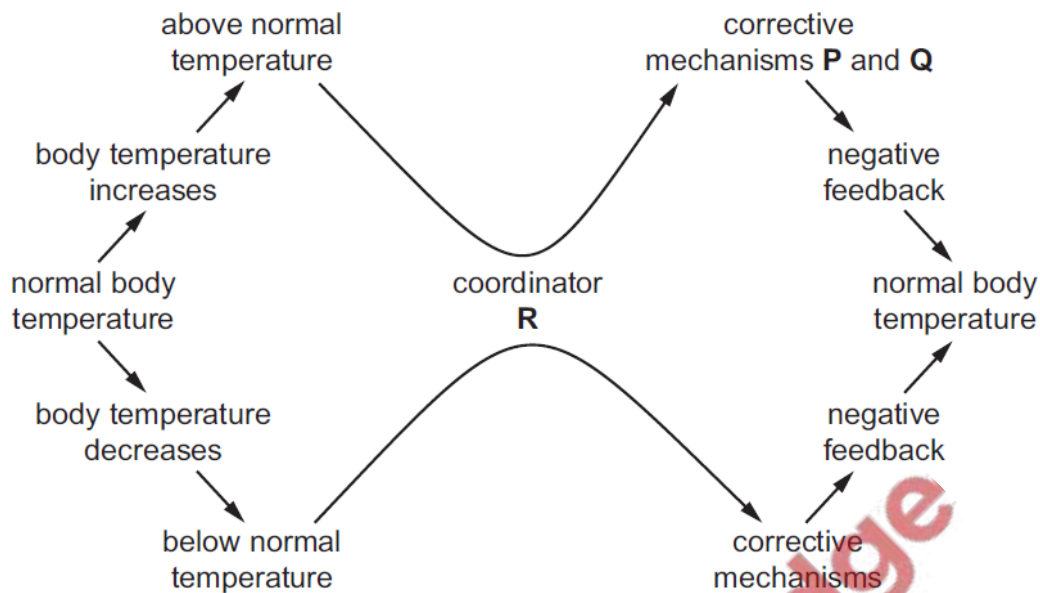
(b) Describe the possible effects of abuse of a **named** drug.

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..... [7]

[Total: 10]

15. Jun/2021/Paper_11/No.20

The diagram shows the homeostatic control of body temperature.



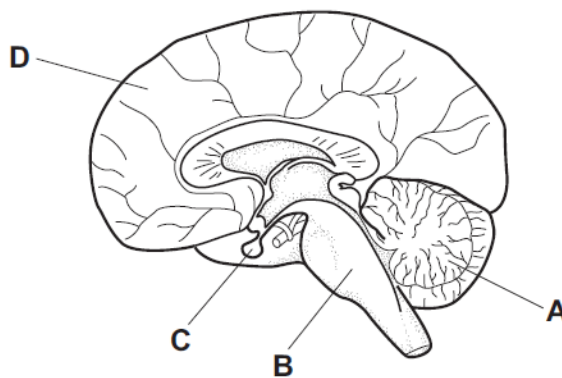
What are corrective mechanisms **P** and **Q** and coordinator **R**?

| | corrective mechanisms | | coordinator R |
|----------|-----------------------|--|----------------------|
| | P | Q | |
| A | sweating | more blood flows close to the skin surface | brain |
| B | sweating | more blood flows close to the skin surface | skin |
| C | shivering | less blood flows close to the skin surface | brain |
| D | shivering | less blood flows close to the skin surface | skin |

16. Jun/2021/Paper_11/No.21

The diagram shows a section through the brain.

Which part of the brain secretes hormones?



17. Jun/2021/Paper_11/No.22

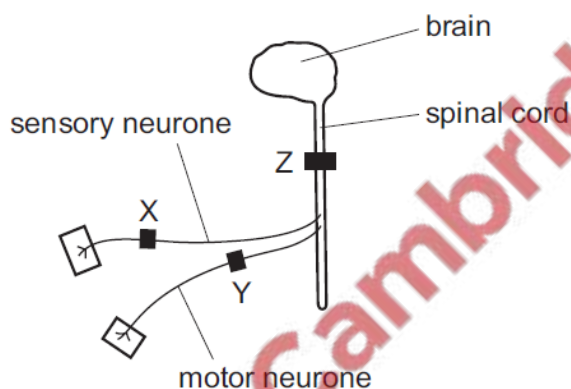
Which changes occur in the eye when viewing a distant object?

- 1 The ciliary muscles contract.
- 2 The ciliary muscles relax.
- 3 The suspensory ligaments are pulled tight.
- 4 The suspensory ligaments are slackened.

A 1 and 3 B 1 and 4 C 2 and 3 D 2 and 4

18. Jun/2021/Paper_11/No.23

The diagram shows three positions, X, Y and Z, where nerve impulses are blocked by a drug.



Which person listed below moves their leg in response to a pinprick, but does not feel it?

- A a person with a block at X
- B a person with a block at Y
- C a person with a block at Z
- D a person with no block

19. Jun/2021/Paper_11/No.24

Which pair of bones form a hinge joint in the forelimb?

- A humerus and scapula
- B radius and ulna
- C scapula and radius
- D ulna and humerus

20. Jun/2021/Paper_11/No.25

What are the effects of drinking a large quantity of alcohol on the human body?

| | effects on the body | | |
|----------|---------------------|---------------|-------------|
| | acts as a | reaction time | damages the |
| A | depressant | decreases | kidney |
| B | depressant | increases | liver |
| C | stimulant | increases | kidney |
| D | stimulant | decreases | liver |

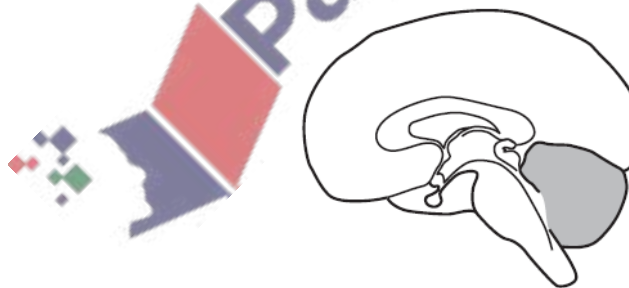
21. Jun/2021/Paper_12/No.20

Which response will happen if a person walks into a cold environment?

- A** Hair erector muscles cause the body hairs to lay flat on the skin.
- B** More blood flows in the capillaries near the surface of the skin.
- C** Large body muscles contract and relax rapidly.
- D** The sweat glands produce a larger amount of sweat.

22. Jun/2021/Paper_12/No.21

The diagram shows the human brain.



What is the name of the shaded part of the brain?

- A** cerebellum
- B** cerebrum
- C** hypothalamus
- D** medulla

23. Jun/2021/Paper_12/No.22

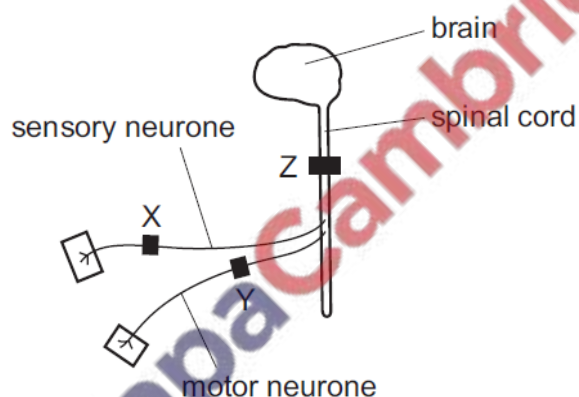
What happens in the eye to produce the pupil reflex to bright light?

- 1 ciliary muscle contraction
- 2 circular muscle contraction
- 3 radial muscle relaxation
- 4 suspensory ligaments pulled tight

A 1 and 3 B 1 and 4 C 2 and 3 D 2 and 4

24. Jun/2021/Paper_12/No.23

The diagram shows three positions, X, Y and Z, where nerve impulses are blocked by a drug.

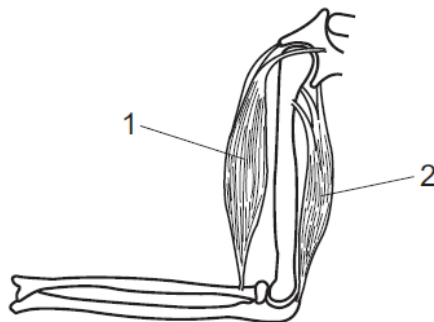


Which person listed below moves their leg in response to a pinprick, but does **not** feel it?

- A a person with a block at X
- B a person with a block at Y
- C a person with a block at Z
- D a person with no block

25. Jun/2021/Paper_12/No.24

The diagram shows how antagonistic muscles are arranged in the arm.



Which row describes the muscle action when the arm is straightened?

| | muscle 1 | muscle 2 |
|----------|-----------|-----------|
| A | contracts | expands |
| B | contracts | relaxes |
| C | expands | contracts |
| D | relaxes | contracts |

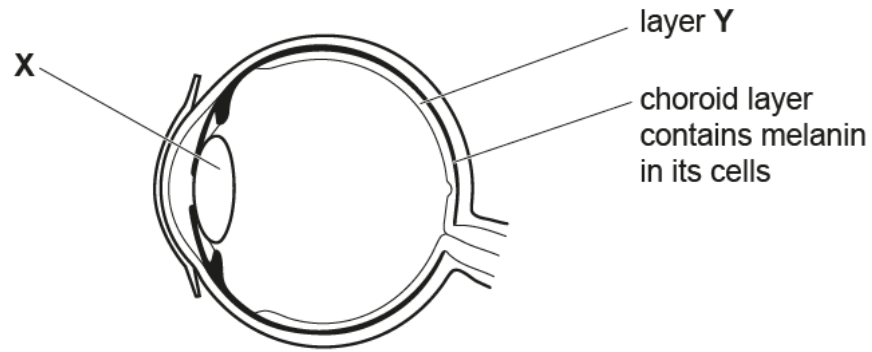
26. Jun/2021/Paper_12/No.25

Electronic cigarettes are a cigarette substitute allowing nicotine to be inhaled without the other components found in cigarette smoke.

Which effects of cigarette smoking will also be effects of using electronic cigarettes?

- A** Smoking increases heart rate, narrows the arterioles and increases blood pressure.
- B** Smoking irritates the airways and increases mucus production.
- C** Smoking reduces oxygen carried by red blood cells and reduces oxygen delivered to the tissues.
- D** Smoking narrows the airways and increases coughing.

A person visits an eye doctor to have an eye test. On the wall of the doctor's room is a diagram of an eye.



(a) (i) Name the part labelled X.

.....

[1]

(ii) Describe **one** way in which the structure of X is related to its function.

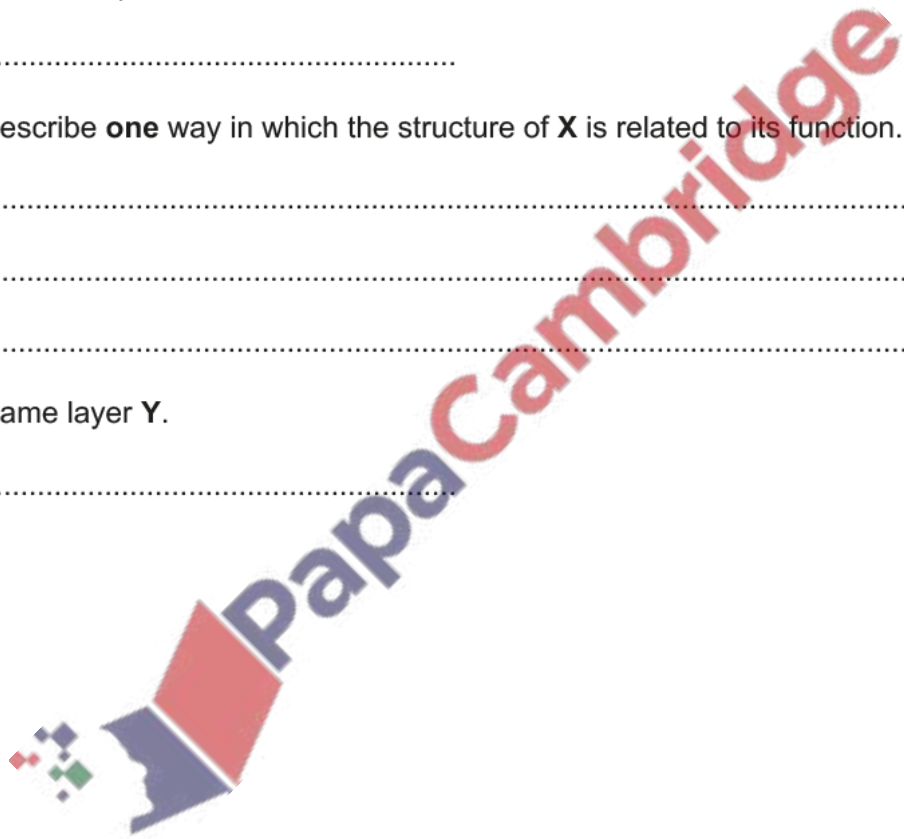
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[2]

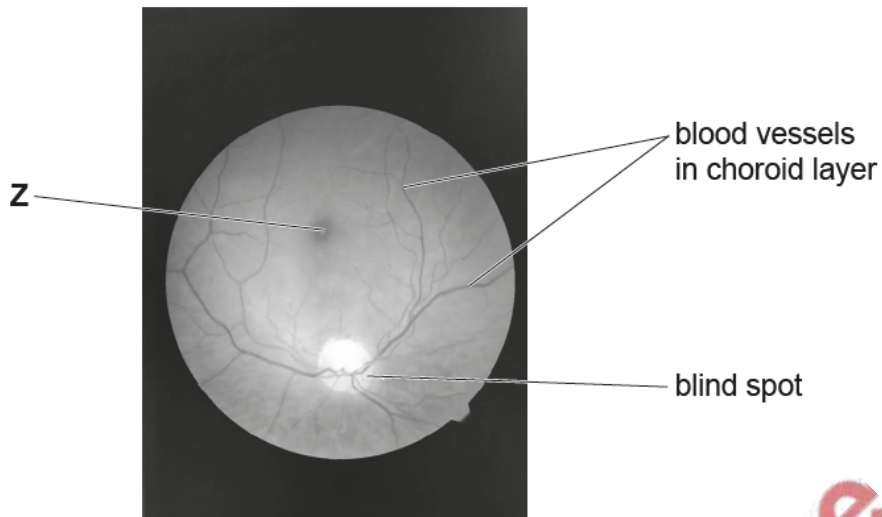
(iii) Name layer Y.

.....

[1]



(b) As part of the eye test, the doctor shines a bright light into the eye and takes a picture. The picture shows layer Y and the choroid layer behind it.



(i) Name structure Z.

.....

[1]

(ii) Layer Y does not contain blood vessels.
Explain how the blood vessels in the choroid layer are important for layer Y.

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[4]

(c) When the bright light is shone into the eye there is a pupil reflex which causes the pupil to become smaller.

Explain how named parts of the eye and of the nervous system are involved in this pupil reflex.

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[4]

- (d) Some people inherit a condition which prevents the production of the dark pigment melanin in their choroid and skin cells. The gene involved has two alleles, **A** (dominant) and **a** (recessive). Only people with two recessive alleles have this condition.

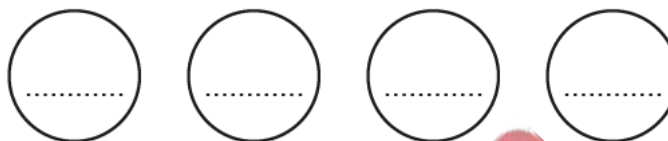
Two people, each with a heterozygous genotype, have children together.

- (i) Complete the genetic diagram to show the possible genotypes and phenotypes of the children.

genotypes of parents

..... ×

gametes



possible genotypes of children

.....

possible phenotypes of children

.....

[4]

- (ii) State the probability of these two people having a child who does **not** produce melanin.

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[1]

[Total: 18]



(a) Excess amino acids are broken down in liver cells to form molecules of urea.

Describe the pathway taken by a molecule of urea, from the liver of a mammal until it reaches the soil.

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..... [7]

(b) Urea is a molecule which contains nitrogen.
Suggest why it is important that molecules that contain nitrogen are added to the soil.

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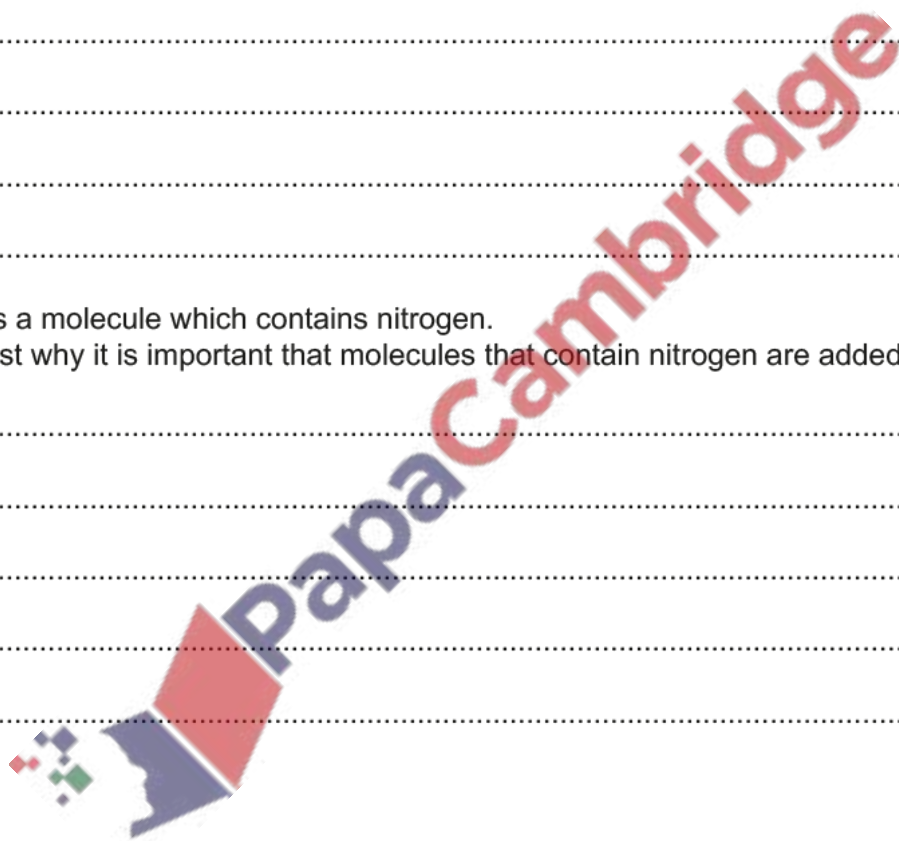
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..... [3]

[Total: 10]



- (a) Rice, maize and wheat plants are the main carbohydrate source for more than 60% of the human population.

Describe how plants like these produce carbohydrates using materials from the environment.

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[5]

- (b) Many scientists predict that, as the world’s human population increases, there will be a shortage of food.

Suggest and explain why an increase in human population is predicted to lead to a global human food shortage.

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[5]

[Total: 10]