

Homeostasis

Question Paper

Level	O Level
Subject	Biology
Exam Board	Cambridge International Examinations
Topic	Homeostasis
Sub Topic	
Booklet	Question Paper

Time Allowed: 42 minutes

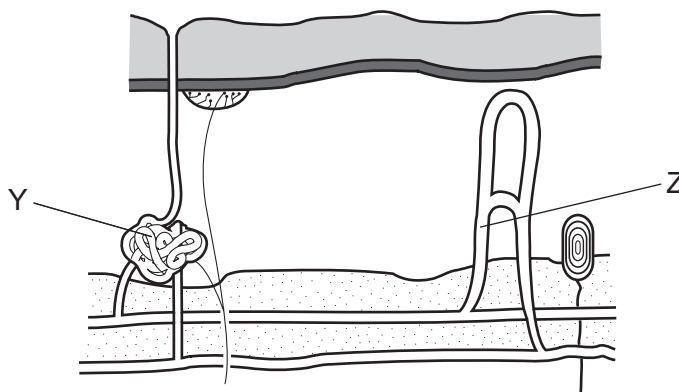
Score: /35

Percentage: /100

- 1 Which process is **not** a result of negative feedback?
- A A decrease in the surrounding temperature leads to a decrease in respiration rate.
 - B A decrease in the surrounding temperature leads to a decrease in sweating.
 - C A decrease in the surrounding temperature leads to a decrease in blood flow through the skin surface.
 - D A decrease in the surrounding temperature leads to shivering.
- 2 When the temperature of the air is higher than body temperature, which of these control mechanisms can help to maintain a constant body temperature?

	constriction of blood vessels in skin	shivering	sweating
A	✓	✓	✓
B	✓	x	x
C	x	✓	x
D	x	x	✓

- 3 The diagram shows some of the structures in human skin.



Which labels describe the structures Y and Z in hot conditions?

	Y	Z
A	active	constricted
B	active	dilated
C	inactive	constricted
D	inactive	dilated

- 4 What are the responses to decreased body temperature?
- A shivering and vasoconstriction in blood vessels near the skin surface
 - B shivering and vasodilation in blood vessels near the skin surface
 - C sweating and vasoconstriction in blood vessels near the skin surface
 - D sweating and vasodilation in blood vessels near the skin surface
- 5 Which process keeps conditions such as temperature and glucose concentration constant inside the body?
- A excretion
 - B homeostasis
 - C secretion
 - D vasodilation
- 6 What happens when the body temperature rises above normal?

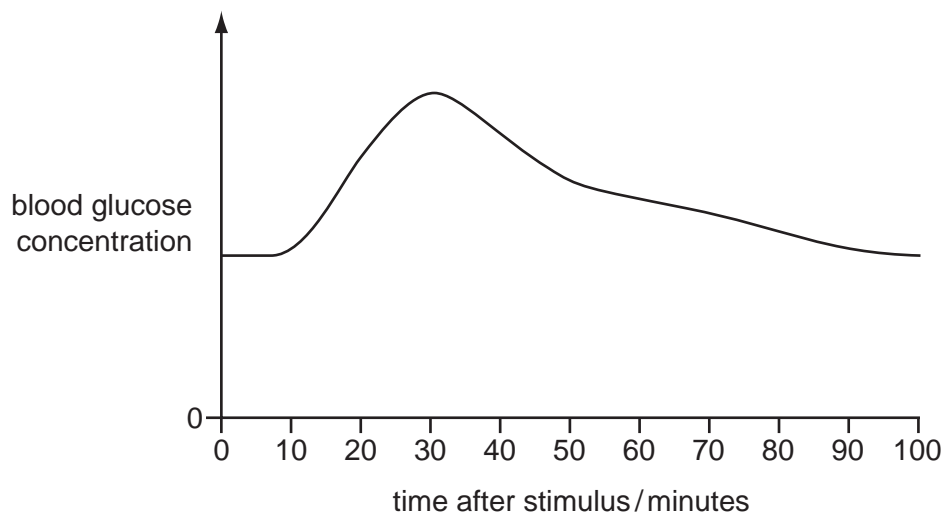
	arterioles near skin surface	sweat secreted
A	constricted	yes
B	constricted	no
C	dilated	yes
D	dilated	no

- 7 How does adrenaline affect glucose uptake by muscle cells and carbohydrate conversion by liver cells?

	glucose uptake	carbohydrate conversion
A	decreases	glucose to glycogen
B	decreases	glycogen to glucose
C	increases	glucose to glycogen
D	increases	glycogen to glucose

- 8 Which of these correct statements describes control by **negative** feedback?
- A An injury to body tissue activates platelets in the blood and these activated platelets release chemicals which activate more platelets.
 - B During the menstrual cycle, luteinising hormone stimulates the release of oestrogen which in turn stimulates the release of more luteinising hormone.
 - C The onset of contractions during childbirth causes the release of a hormone which stimulates further contractions.
 - D When blood pressure is high, nerve impulses from the brain cause the blood vessels to dilate and blood pressure is reduced.

- 9 The graph shows changes in blood glucose concentration when a body responds to an external stimulus.



What is the hormone responsible for the change in blood glucose concentration in the first 30 minutes?

- A adrenaline
- B fibrinogen
- C glycogen
- D insulin

10 Which information about the listed glands is correct?

	gland	hormone produced	target organ	effect
A	adrenal	adrenaline	heart	decreases heart rate
B	ovary	oestrogen	uterus	increases thickness of lining
C	pancreas	insulin	liver	converts glycogen to glucose
D	pituitary	FSH	uterus	causes ovulation

11 If the air temperature is higher than the core body temperature, which processes can increase heat loss from the body?

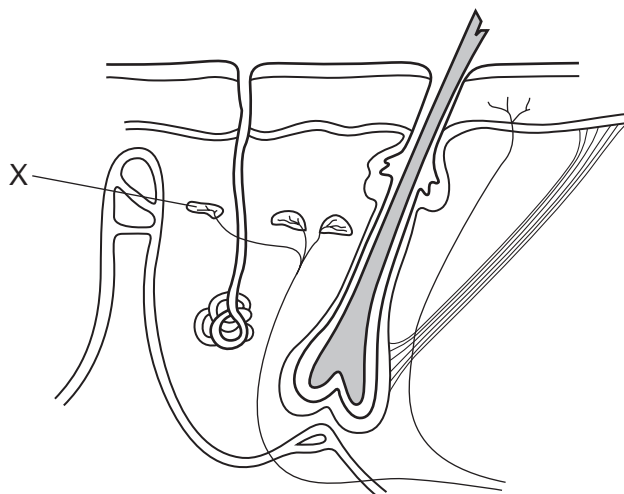
	shivering by muscles	evaporation of sweat	vasodilation in the skin
A	✓	x	✓
B	✓	x	x
C	x	✓	✓
D	x	✓	x

key

✓ = can increase heat loss

x = cannot increase heat loss

12 The diagram shows some of the structures seen in a section through human skin.



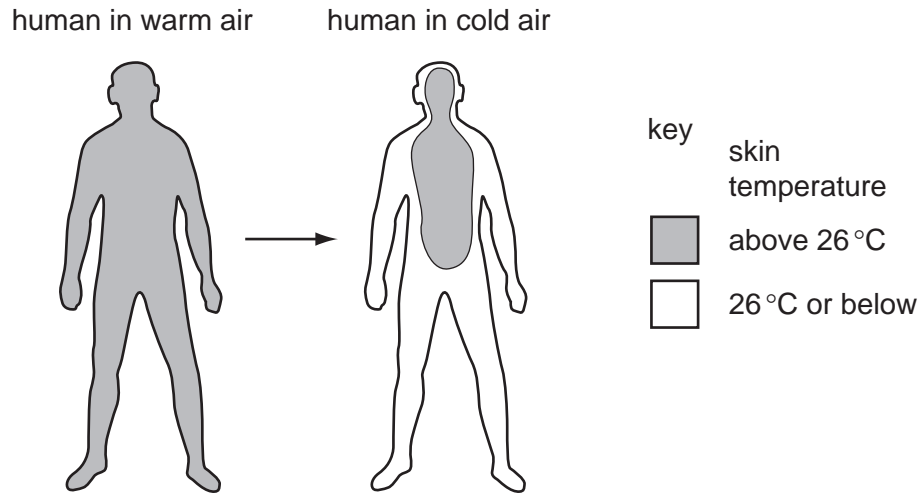
What is the function of structure X?

- A to cause capillaries to constrict
- B to detect changes in temperature
- C to receive impulses from the central nervous system
- D to stimulate sweat glands to release sweat

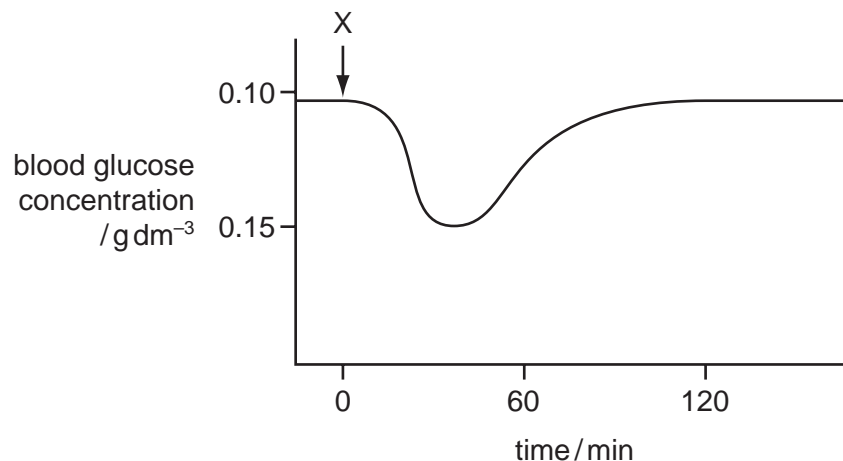
13 Which parts of the skin are involved in the control of body temperature?

	sweat glands	temperature receptors	blood vessels
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

- 14 The diagram shows skin temperature of a human when exposed to warm air and then exposed to cold air.



- What causes the observed change in skin temperature on exposure to cold air?
- A less blood flowing just below the skin
 - B less blood going to the heart and lungs
 - C more blood flowing just below the skin
 - D more blood going to the heart and lungs
- 15 The graph shows the changes in blood glucose concentration following the injection of a small amount of a substance into the blood of a person at time X.



Which substance was injected at time X?

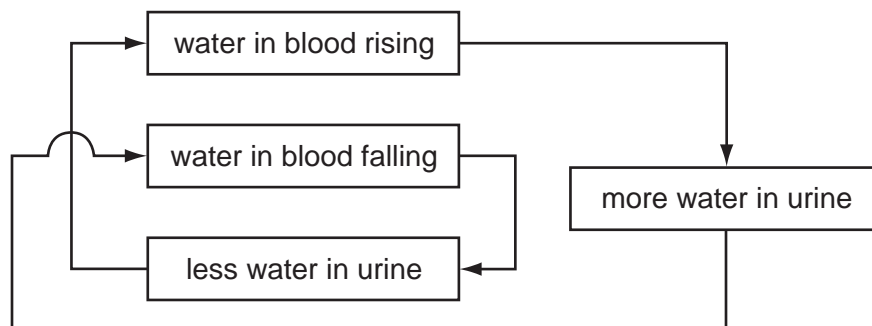
- A adrenaline
- B insulin
- C oestrogen
- D penicillin

- 16 What happens when the body temperature of a human is controlled?
- A body temperature is made more different from environmental temperature
 - B body temperature is made more different from ideal body temperature
 - C body temperature is made more similar to environmental temperature
 - D body temperature is made more similar to ideal body temperature

17 Which changes will occur when a person walks from a very cold room into a hot room?

	sweating	skin blood vessels
A	decreases	constrict
B	decreases	dilate
C	increases	dilate
D	increases	constrict

18 The diagram refers to the control of water concentration in the blood.

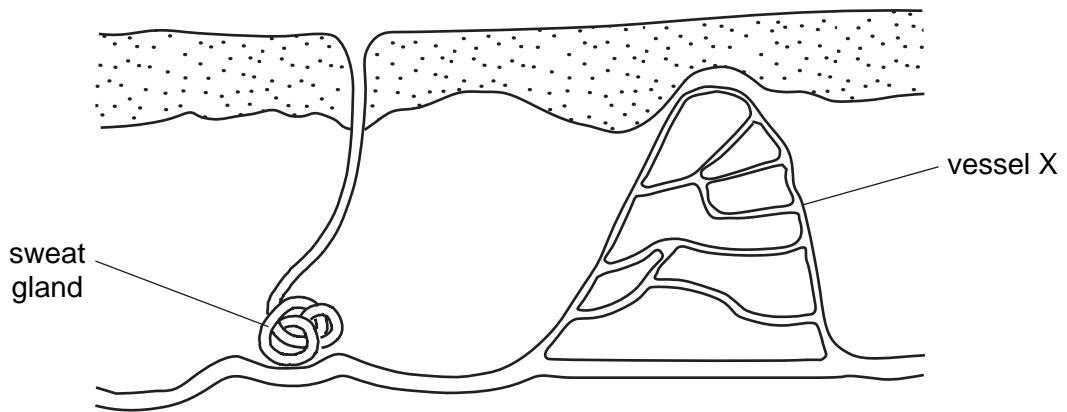


Why is this a negative feedback system?

- A It decreases the amount of water in the blood.
- B It increases any change in the amount of water in the blood.
- C It increases the amount of water in the blood.
- D It reverses any change in the amount of water in the blood.

- 19 What helps heat retention in the human body?
- A actively secreting sweat glands
 - B dilated skin blood vessels
 - C fat in and under the skin
 - D relaxed hair erector muscles
- 20 Which structures are **all** involved in controlling human body temperature?
- A blood vessels near the skin surface, the cerebellum and sweat glands
 - B blood vessels near the skin surface, the hypothalamus and skeletal muscles
 - C kidneys, the cerebellum and sweat glands
 - D kidneys, the hypothalamus and skeletal muscles

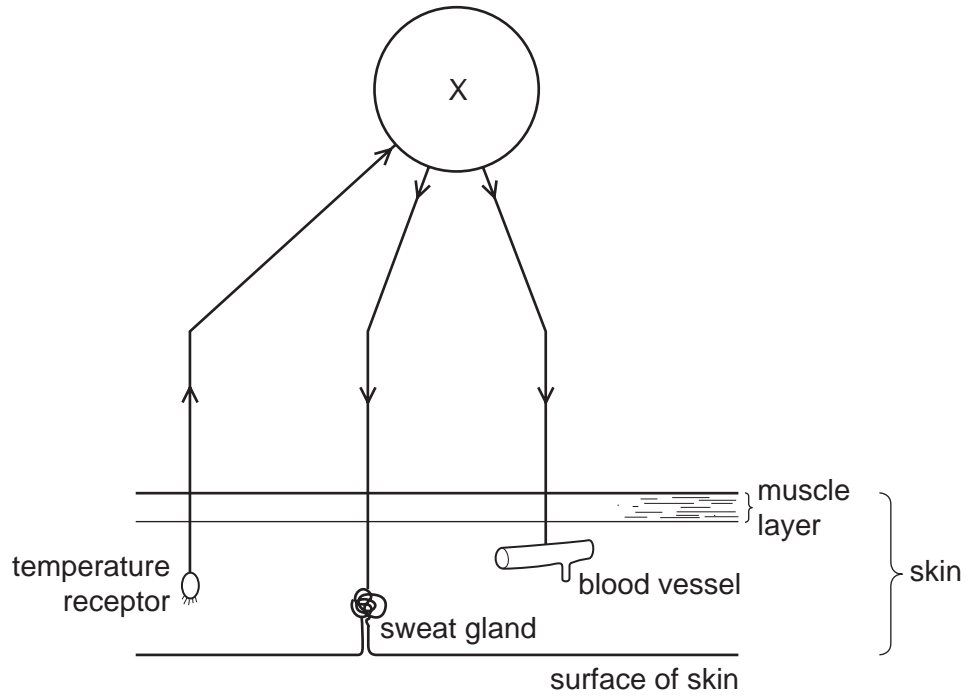
21 The diagram shows a section through skin.



What happens if the body temperature starts to fall below normal?

	sweat glands	blood flow in vessel X
A	secrete sweat	decreases
B	secrete sweat	increases
C	stop secreting sweat	decreases
D	stop secreting sweat	increases

22 The diagram shows some nerve pathways involved in temperature control of the human body.



Which part of the nervous system does X represent?

- A cerebrum
- B hypothalamus
- C medulla
- D pituitary gland

23 When a person moves from a cold room into a hot room, the following responses occur.

- 1 The brain co-ordinates the response.
- 2 The skin begins to secrete sweat.
- 3 Sweat evaporates from the skin surface.
- 4 Temperature receptors are stimulated in the skin.

What is the correct sequence of events?

- A 3 → 4 → 1 → 2
- B 2 → 3 → 4 → 1
- C 4 → 1 → 2 → 3
- D 1 → 4 → 2 → 3

24 When a person is cold, nerve impulses from the hypothalamus cause the skin to reduce the rate of heat loss.

What is the effect of these nerve impulses on the hair erector muscles and on the arterioles near the skin surface?

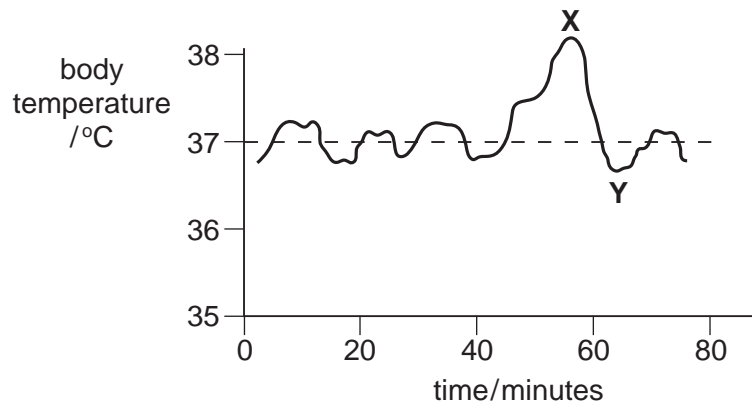
	hair erector muscles	arterioles near skin surface
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

25 What is meant by negative feedback?

- A A change away from a set point causes a change back towards the set point.
- B A change away from a set point causes further change away from the set point.
- C A change towards a set point causes a change away from a set point.
- D Changes away from a set point are prevented.

- 26 Which response to a drop in body temperature does **not** involve muscle contraction?
- A blood vessels narrowing
 - B hairs standing up
 - C shivering
 - D reduced sweating
- 27 Which of these four mechanisms that lower the body temperature is the slowest to occur?
- A dilation of surface capillaries
 - B relaxation of hair erector muscles
 - C secretion of sweat
 - D thinning subcutaneous fat layer
- 28 The body can regulate both its temperature and the amount of water in its cells.
What are these processes?
- A assimilation
 - B excretion
 - C homeostasis
 - D osmosis

29 The graph shows changes in a person's body temperature plotted against time.

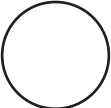


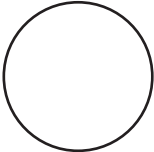
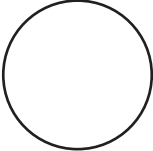

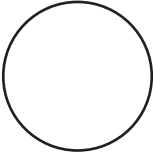
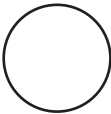


What causes the change in temperature between **X** and **Y**?

- A increased air temperature
- B increased evaporation of sweat
- C reduced blood flow through surface capillaries
- D shivering

30 The circles represent the diameter of the blood vessels in the surface of the skin as the body temperature changes.

Which shows the diameter of the blood vessels after a decrease and after an increase in body temperature?

	diameter of blood vessels	
	after a decrease in body temperature	after an increase in body temperature
A		
B		
C		
D		

31 What happens when the core temperature of the body increases?

	diameter of surface blood vessels	urine production
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

32 On a hot day how would these skin structures respond to help maintain a constant body temperature?

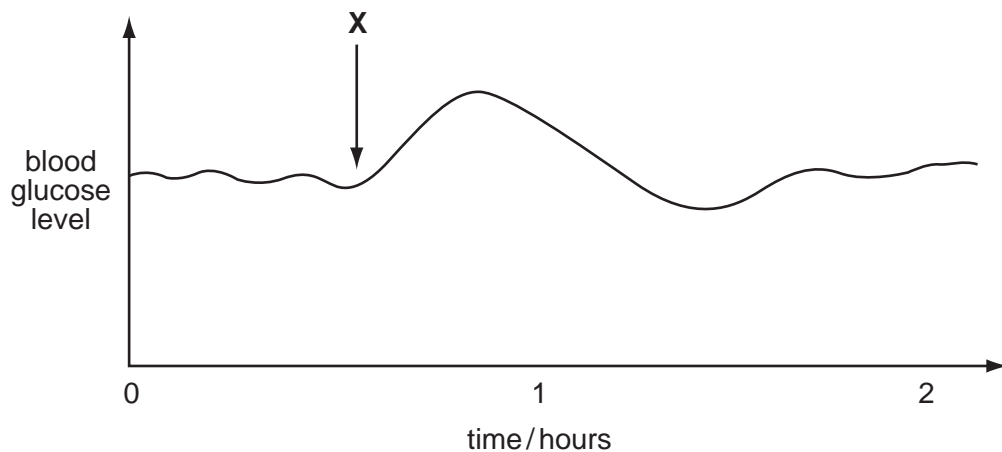
	sweat gland	surface blood vessels
A	decreased sweat production	contract
B	decreased sweat production	dilate (get wider)
C	increased sweat production	contract
D	increased sweat production	dilate (get wider)

33 A finger that touches a hot object is quickly taken away from the source of heat.

What is the role of relay neurones in this response?

- A** to carry nerve impulses within the spinal cord
- B** to generate impulses in the receptors of the finger
- C** to link the sense organs to the sensory neurones
- D** to pass nerve impulses out to the neurones

34 The graph shows changes in the glucose concentration in the blood of a person during two hours.



What explains the shape of the graph after **X**?

- A** The person has eaten a sugary sweet meal.
- B** The person has had an insulin injection.
- C** The person is suffering from diabetes mellitus.
- D** The person starts some hard physical exercise.

35 When the external temperature drops, the following changes may take place in the human body.

- 1 body temperature falls
- 2 body temperature rises
- 3 brain detects cooler blood
- 4 shivering begins

In which order do they occur?

	first	→	last	
A	1	3	4	2
B	1	4	3	2
C	3	2	4	1
D	3	4	2	1