1.5 Homeostasis and Response: 30-minute Pack

AQA 8461 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Give one common treatment for a person with type 1 diabetes, and give one other way their condition is managed day to day.

(Total for Question 1 is 2 marks)

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2 Rhys accidentally touches a hot pan and pulls his hand away quickly, before he feels any pain.

(a) Identify the type of response described. **(1)**

(b) Put the following in the correct order to show how information passes through the nervous system during this reflex action: effector, receptor, relay neurone, sensory neurone, motor neurone. **(2)**

(c) Explain why reflex actions are important for survival. **(2)**

(Total for Question 2 is 5 marks)

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3 The human body maintains a fairly constant internal temperature. Describe two ways the body reduces heat loss when core temperature falls below the normal set point.

(a) Describe one change in blood vessels that reduces heat loss. **(1)**

(b) Describe one muscular response that reduces heat loss. **(1)**

(c) Give one behavioural change a person might use to reduce heat loss. **(1)**

(Total for Question 3 is 3 marks)

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4 A student draws the pathway for a simple reflex arc: receptor -> sensory neurone -> spinal cord -> motor neurone -> effector.
State the type of effector for a reflex that moves the hand away from a hot object, and name the neurotransmitter commonly released at the neuromuscular junction.

(a) State the type of effector that moves the hand away. **(1)**

(b) Name the neurotransmitter commonly released at the neuromuscular junction to cause muscle contraction. **(2)**

(Total for Question 4 is 3 marks)

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5 Blood glucose concentration is monitored and controlled by the pancreas.

(a) Name the organ that monitors and controls blood glucose concentration. **(1)**

(b) Describe what happens, in terms of hormone release and its effect on the liver, when blood glucose concentration rises after a meal. **(3)**

(c) Explain the difference between type 1 and type 2 diabetes. **(2)**

(Total for Question 5 is 6 marks)

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6 The menstrual cycle is controlled by the interaction of several hormones, including FSH, LH, oestrogen and progesterone, over a 28-day cycle.

(a) Name the hormone, released by the pituitary gland, that stimulates the maturation of an egg in the ovary. **(1)**

(b) Name the hormone responsible for triggering ovulation, and state on which day of a 28-day cycle this typically occurs. **(2)**

(c) If the egg is not fertilised, the concentration of progesterone falls sharply towards the end of the cycle. Explain the effect this has on the lining of the uterus. **(2)**

(Total for Question 6 is 5 marks)

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Mark scheme · 1.5 Homeostasis and Response: 30-minute Pack

Question 1

insulin injections or use of an insulin pump **B1**

and a brief acceptable additional point such as monitoring blood glucose or a controlled diet, oe **B1**

Answer: Insulin injections or an insulin pump; plus monitoring blood glucose levels.

Question 2

(a) a reflex (action), oe **B1**

(a) Answer: A reflex action.

(b) receptor first and effector last identified, oe **B1**

(b) fully correct order: receptor, sensory neurone, relay neurone, motor neurone, effector **B1**

(b) Answer: Receptor, sensory neurone, relay neurone, motor neurone, effector.

(c) reflex actions are automatic and do not need conscious thought/involvement of the brain, oe **B1**

(c) this makes the response much faster, reducing the time taken to react to a potentially damaging/dangerous stimulus, oe **B1**

(c) Answer: Reflex actions do not involve conscious thought in the brain, so they happen very quickly, reducing the risk of harm from a dangerous stimulus.

Question 3

(a) vasoconstriction of arterioles near the skin reducing blood flow to the skin, oe **B1**

(a) Answer: Vasoconstriction of arterioles near the skin so less warm blood reaches the surface.

(b) shivering: involuntary muscle contractions produce extra heat, oe **B1**

(b) Answer: Shivering: involuntary rapid muscle contractions that generate heat.

(c) putting on extra clothes, moving to a warmer place, or wrapping in a blanket, oe **B1**

(c) Answer: Put on extra clothing (for example, wear a jumper or wrap a blanket).

Question 4

(a) skeletal muscle (or voluntary muscle) cao **B1**

(a) Answer: Skeletal muscle

(b) identifies acetylcholine as the neurotransmitter released at the neuromuscular junction **M1**

(b) acetylcholine cao **A1**

(b) Answer: Acetylcholine

Question 5

(a) pancreas **B1**

(a) Answer: Pancreas.

(b) the pancreas releases (more) insulin into the blood, oe **B1**

(b) insulin causes the liver (and muscle cells) to take up glucose from the blood, oe **B1**

(b) glucose is converted into glycogen for storage, so blood glucose concentration falls back towards normal, oe **B1**

(b) Answer: The pancreas releases insulin, which causes the liver (and muscles) to take up glucose from the blood and convert it into glycogen for storage, lowering blood glucose concentration.

(c) in type 1 diabetes, the pancreas produces little or no insulin, so insulin injections are needed to control blood glucose concentration, oe **B1**

(c) in type 2 diabetes, the body's cells no longer respond properly to insulin (insulin resistance), often controlled through diet, exercise, medication, oe **B1**

(c) Answer: Type 1 diabetes: the pancreas produces little or no insulin, treated with insulin injections. Type 2 diabetes: body cells stop responding properly to insulin, often managed by diet, exercise or medication.

Question 6

(a) FSH (follicle stimulating hormone) **B1**

(a) Answer: FSH (follicle stimulating hormone).

(b) LH (luteinising hormone) **B1**

(b) day 14 **B1**

(b) Answer: LH (luteinising hormone); day 14.

(c) progesterone is needed to maintain the thickened lining of the uterus, oe **B1**

(c) as its concentration falls, the lining is no longer maintained, so it breaks down and is shed (menstruation begins), oe **B1**

(c) Answer: Progesterone maintains the uterus lining; as its concentration falls, the lining is no longer supported and breaks down, leading to menstruation.

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