

Animal coordination, control and homeostasis practice questions

15 questions • 50 marks • mark scheme at the back

For Edexcel GCSE Combined Science 1SC0. **Higher tier** is only on the Higher paper.

Name

Total / 50

Hormones and the endocrine system Spec 7.1-7.3

1 Which row correctly matches a gland with a hormone it produces? [1 mark]

- A. ☐ Testes and insulin
- B. ☐ Ovaries and oestrogen
- C. ☐ Pituitary gland and thyroxine
- D. ☐ Thyroid gland and adrenalin

2 Describe how a hormone gets from an endocrine gland to its target organ. [2 marks]

3 **Higher tier** [4 marks]

A person is startled by a loud noise and the adrenal glands release adrenalin. Explain how adrenalin prepares the body for fight or flight.

4

Higher tier

[4 marks]

The level of thyroxine in a person's blood falls below normal. Explain how the body returns the level of thyroxine to normal.

The menstrual cycle and fertility control Spec 7.4-7.8

5

Describe the stages of the menstrual cycle, including the roles of oestrogen and progesterone.

[4 marks]

6

Higher tier

[6 marks]

Explain how the interactions of FSH, LH, oestrogen and progesterone control the menstrual cycle, including the repair and maintenance of the uterus wall, ovulation and menstruation.

7 The contraceptive pill contains oestrogen and progesterone. Explain how the pill prevents pregnancy. **[3 marks]**

8 A couple are choosing between the contraceptive pill and condoms. Evaluate the two methods. **[4 marks]**

9 **Higher tier** **[4 marks]**
(a) Explain how hormones are used in IVF treatment. (2) (b) Explain how clomifene therapy helps a woman who does not ovulate to become pregnant. (2)

Homeostasis and temperature control **Spec 7.9-7.12B**

10 Explain why it is important for the body to maintain a constant internal environment when conditions outside the body change. **[2 marks]**

Blood glucose and diabetes Spec 7.13-7.17

11 Explain how insulin controls blood glucose concentration after a meal. **[3 marks]**

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12 **Higher tier** Explain how glucagon increases blood glucose concentration. **[3 marks]**

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13 Describe the causes of type 1 diabetes and type 2 diabetes and how each is controlled. **[4 marks]**

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14 A woman has a mass of 72 kg and a height of 1.60 m. Her waist is 88 cm and her hips are 100 cm. (a) Calculate her BMI. Give your answer to 1 decimal place. (2) (b) Calculate her waist:hip ratio. (1) **[3 marks]**

Answer =

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15 The table shows practice figures for the percentage of adults with type 2 diabetes in three BMI groups. Evaluate the evidence that a higher BMI causes type 2 diabetes. **[3 marks]**

Type 2 diabetes in three BMI groups (practice figures)	
BMI group	Adults with type 2 diabetes (%)
Below 25	2
25 to 29.9	6
30 and above	15

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Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

B B (1)

2. [2]

- the gland secretes / releases the hormone into the blood (1) allow bloodstream
- the blood (plasma) carries the hormone to the target organ (1) do not accept nerves

3. [4] Higher tier

- increases heart rate (1)
- increases blood pressure (1)
- increases blood flow to the muscles (1)
- so more oxygen and glucose are delivered for respiration (1)
- stimulates the liver to change glycogen into glucose (1)
- raising blood sugar (glucose) level (1)
- Max 4

4. [4] Higher tier

- low thyroxine stimulates the hypothalamus to produce TRH (1)
- TRH causes the pituitary gland to release TSH (1)
- TSH acts on the thyroid gland to produce thyroxine (1)
- when thyroxine is back to normal it inhibits the release of TRH and the production of TSH (1) allow negative feedback

5. [4]

- the uterus lining breaks down / menstruation happens around days 1 to 5 (1) allow bleeding
- oestrogen causes the repair / growth of the uterus lining (1)
- an egg is released (ovulation) around day 14 (1)
- progesterone maintains the uterus lining (1) allow until around day 28

6. [6] Higher tier

Level 3 5-6	A detailed and logical explanation that links all four hormones to the correct effects, including how some hormones stimulate or inhibit others, and covers repair and maintenance of the lining, ovulation and menstruation.
Level 2 3-4	Some explanation linking at least two hormones to correct effects. Some interactions are given but one stage, such as menstruation, may be missing or unclear.
Level 1 1-2	A few simple statements about hormones or stages with little or no explanation of how they interact.

Indicative content

- FSH from the pituitary gland causes an egg to mature in the ovary
- FSH stimulates the ovaries to produce oestrogen
- oestrogen causes repair and growth of the uterus lining
- high oestrogen inhibits FSH and stimulates the release of LH
- LH causes ovulation (around day 14)
- after ovulation progesterone is produced, which maintains the uterus lining
- progesterone inhibits FSH and LH so no more eggs mature
- if there is no pregnancy progesterone falls, the lining breaks down and menstruation happens

7. [3]

- the hormones stop eggs maturing / stop ovulation (1)
- so there is no egg to be fertilised (1)
- progesterone makes the mucus at the cervix thicker (1)
- so sperm cannot get through to the egg (1)
- Max 3

8. [4]

- the pill is very effective if taken correctly (1)
- the pill does not protect against sexually transmitted infections / can cause side effects / must be taken at the right time every day (1)
- condoms protect against sexually transmitted infections / have no hormone side effects (1)
- condoms can split or slip / are less effective if not used correctly (1)
- a justified conclusion, e.g. condoms are better if protection from infection is needed, or the pill if the most reliable contraception is wanted (1)
- Max 3 if only one method is evaluated
- Max 4

9. [4] Higher tier

- (a) the woman is given FSH and LH (1)
- to make several eggs mature in the ovaries (1)
- (b) clomifene stimulates the release of FSH and LH (1)
- so that eggs mature and ovulation happens (1)

10. [2]

- enzymes work best at their optimum conditions / within narrow limits (1)
- so cells can function properly / reactions continue at a suitable rate (1)

11. [3]

- the pancreas secretes insulin into the blood (1)
- insulin causes cells to take up glucose from the blood (1)
- the liver converts glucose into glycogen for storage (1)
- so blood glucose concentration falls to normal (1)
- Max 3

12. [3] Higher tier

- glucagon is secreted by the pancreas when blood glucose is low (1)
- glucagon acts on the liver (1)
- the liver changes glycogen into glucose (1)
- glucose is released into the blood (1)
- Max 3

13. [4]

- type 1: the pancreas does not produce enough insulin (1)
- type 1 is controlled by insulin injections (1) allow monitoring blood glucose and controlling carbohydrate in the diet
- type 2: body cells no longer respond to insulin (1)
- type 2 is controlled by diet and exercise / weight loss (1) allow medication

14. [3]

- (a) height squared = $1.60 \times 1.60 = 2.56$ (1)
- BMI = $72 \div 2.56 = 28.1$ (1) allow 28.125
- (b) $88 \div 100 = 0.88$ (1)

15. [3]

- as BMI increases the percentage with type 2 diabetes increases / positive correlation (1) allow use of figures
- a correlation does not prove that high BMI causes diabetes (1)
- other factors, such as diet, exercise or age, may be involved / BMI does not show fat compared with muscle (1)