

GCSE Biology (9 – 1)

Endocrine System – Hormones

Name:

Group:

Instructions

- Read each question carefully before you begin to answer it.
- Use black ink or black ball-point pen for your answers.
- Fill in the boxes at the top of this page with your name and group.
- Attempt to answer every question in the booklet.
- Answer the questions in the spaces provided – there may be more space than you need in some answer spaces.
- Calculators may be used for this booklet.
- For any calculations, you **must** show all your working.
- Any and all drawings or graphs should be completed in pencil.



For markers use	
Question	Mark
1	/4
2	/7
3	/10
4	/9
Total	/30
%	
Grade	

Information

- The maximum mark for this paper is 30 marks.
- The marks for each question are shown in brackets.
- Please be aware that good English and clear presentation are required in your answers.



1. The endocrine system is a chemical communication network that uses glands to produce hormones, which travel in the bloodstream to control and coordinate the body's functions.

Circle the letter of the correct answer for each question below.

a) Which statement best describes a hormone?

- A** A fast electrical signal that travels along a neurone.
- B** A biological catalyst that speeds up a chemical reaction.
- C** A chemical messenger released from a gland that travels in the blood to a target organ.
- D** A type of cell found in the blood that carries oxygen.

(1 mark)

b) A person is suddenly frightened. Which gland releases a hormone to prepare the body for 'fight or flight', and what is one effect of this hormone?

- A** Pancreas; decreased blood glucose level.
- B** Thyroid gland; decreased metabolic rate.
- C** Pituitary gland; stimulates growth.
- D** Adrenal gland; increased heart rate.

(1 mark)

c) After a person eats a meal rich in carbohydrates, their blood glucose level rises. Which hormone is released to bring the level back down to the normal range, and which organ releases it?

- A** Insulin, released by the pancreas.
- B** Glucagon, released by the pancreas.
- C** Adrenaline, released by the adrenal gland.
- D** Thyroxine, released by the thyroid gland.

(1 mark)

d) The level of thyroxine in the blood is controlled by a negative feedback mechanism. What happens in this system if the level of thyroxine becomes too high?

- A** Less TSH is released by the pituitary gland.
- B** More TSH is released by the pituitary gland.
- C** The thyroid gland increases its metabolic rate.
- D** The pancreas releases glucagon.

(1 mark)

(Total for Question 1 is 4 marks)

2. The endocrine system uses hormones to control functions in the body.
The control of blood glucose concentration is an important example of this.

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

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(1 mark)

A student drank a sugary drink. A doctor measured the student's blood glucose concentration at regular intervals for 180 minutes. The results are shown in the table below.

Time after sugary drink (minutes)	Blood glucose concentration (mmol/L)
0	5.0
30	7.8
60	9.0
90	7.5
120	6.0
180	5.0

b) Calculate the mean rate of decrease of blood glucose concentration between 60 minutes and 180 minutes. You **must** show your working and give the units in your answer.

Mean rate of decrease = ...
(3 marks)

c) Explain the hormonal control that causes the blood glucose concentration to decrease between 60 minutes and 180 minutes.

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(3 marks)

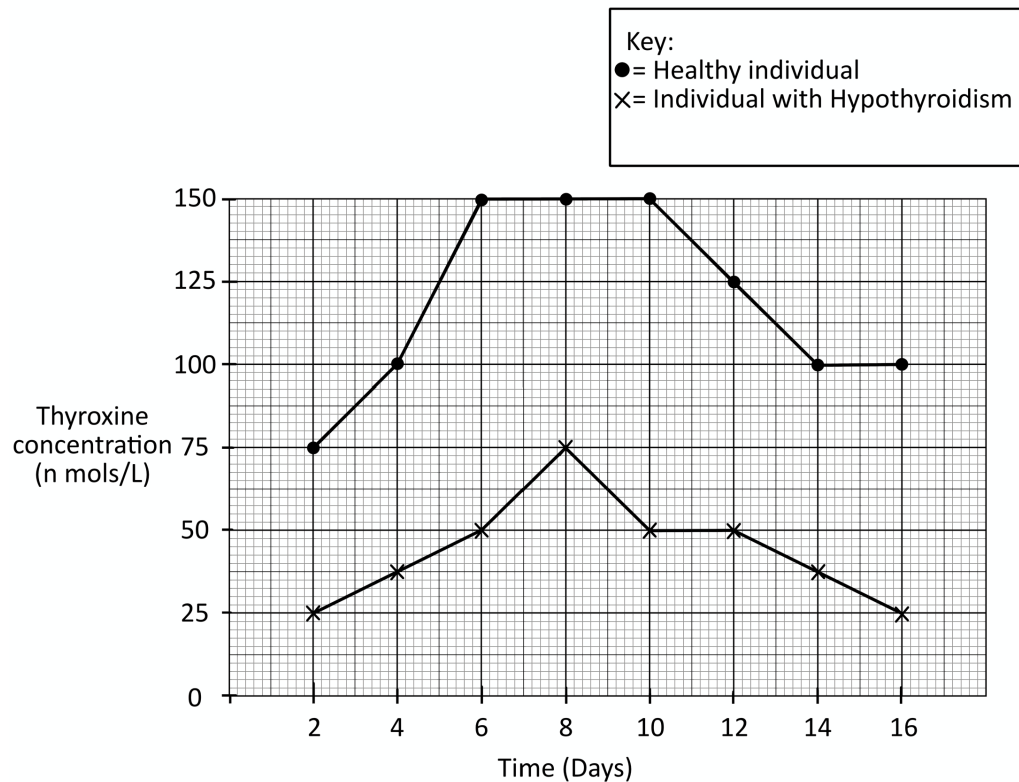
(Total for Question 2 is 7 marks)

3. The concentration of thyroxine in the blood is controlled by a negative feedback system involving the pituitary gland and Thyroid Stimulating Hormone (TSH).

a) State the gland that produces TSH.

(1 mark)

The graph below shows the concentration of thyroxine in the blood of two individuals over a period of time. One individual with normal healthy thyroid function and another individual with a condition called hypothyroidism, an underactive thyroid gland.



b) The concentration of thyroxine in the blood is carefully controlled by a negative feedback system involving the pituitary gland and another hormone called TSH.

Explain how this negative feedback system controls the concentration of thyroxine in the blood.

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

- c) The person with hypothyroidism is treated with a daily dose of synthetic thyroxine. After 8 weeks of treatment, their blood thyroxine concentration is measured again. The results are shown in the table.

Calculate the percentage increase in the person's blood thyroxine concentration after 8 weeks of treatment. Show your working.

(3 marks)

(Total for Question 3 is 10 marks)

4. The endocrine system coordinates many of the body's responses to internal and external changes.

a) State the name of the gland that regulates blood glucose and name **one** hormone it produces.

Gland:

Hormone:

(2 marks)

b) Adrenaline is a hormone released in response to fear or excitement.

Describe **three** effects of adrenaline on the body that prepare it for 'fight or flight'.

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(3 marks)

c) The nervous system and the endocrine system both coordinate responses in the body.

Compare these **two** systems.

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(4 marks)

(Total for Question 4 is 9 marks)