

Hormonal Coordination in Humans

Question Paper 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.5 Homeostasis and Response
Sub-Topic	Hormonal Coordination in Humans
Difficulty Level	Bronze Level
Booklet	Question Paper 1

Time Allowed: 56 minutes

Score: / 55

Percentage: /100

Grade Boundaries:

Q1. A person with Type 1 diabetes does **not** produce enough of the hormone insulin.

(a) Where is the hormone insulin produced?

Tick **one** box.

Brain

☐

Pancreas

☐

Pituitary

☐

Thyroid

☐

(1)

(b) How does insulin travel around the body?

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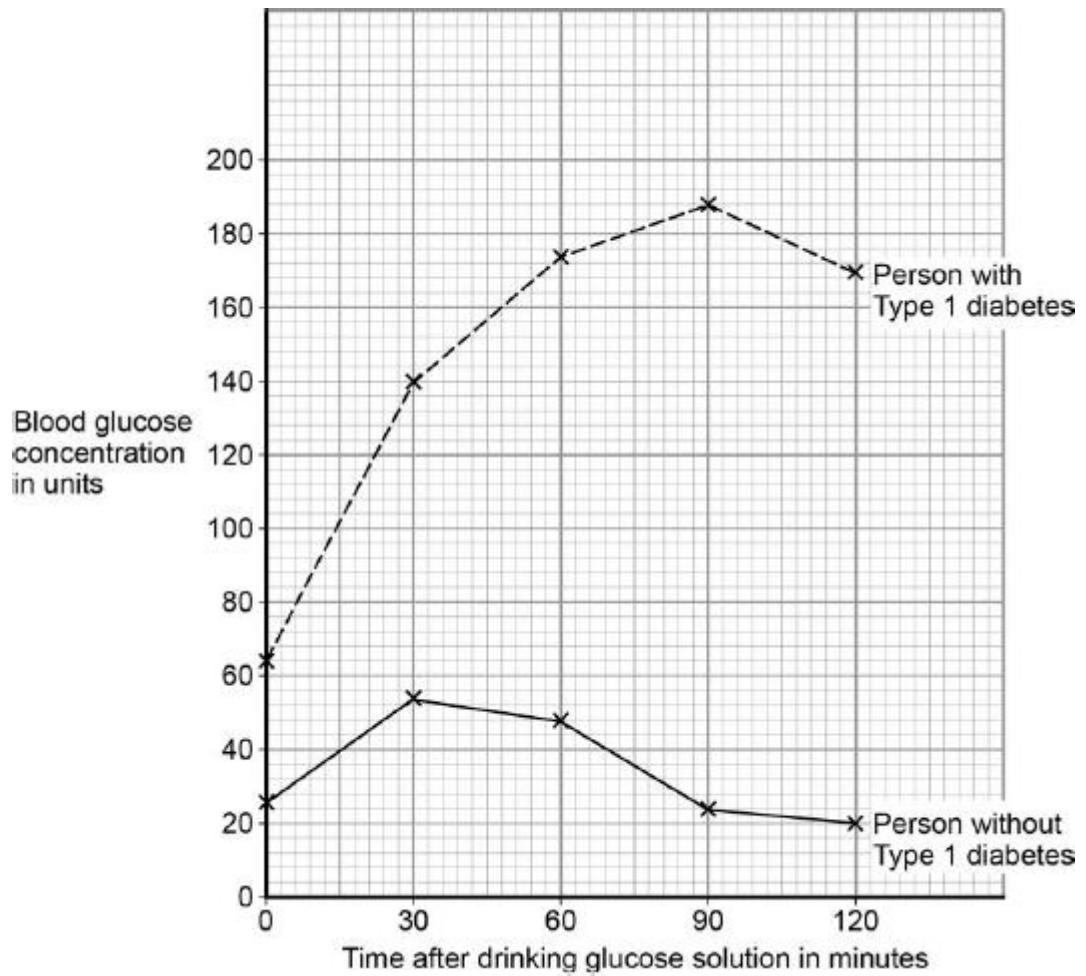
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(1)

(c) The same concentration and volume of glucose solution was given to two people.

- Person with Type 1 diabetes.
- Person without Type 1 diabetes.

The figure below shows how the blood glucose concentration of these two people changed after they each drank a glucose solution.



Look at the figure above.

Compare the blood glucose concentrations of the two people.

Include similarities and differences in your answer.

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(4)

- (d) People with diabetes may be asked to control their diet.

Explain how this can help to reduce the risk of developing health problems.

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(3)
(Total 9 marks)

Q2. Blood sugar levels in the body are controlled by insulin.

- (a) How does insulin travel around the body?

.....

.....

(1)

- (b) The table below shows the blood sugar levels for two people after eating a meal.

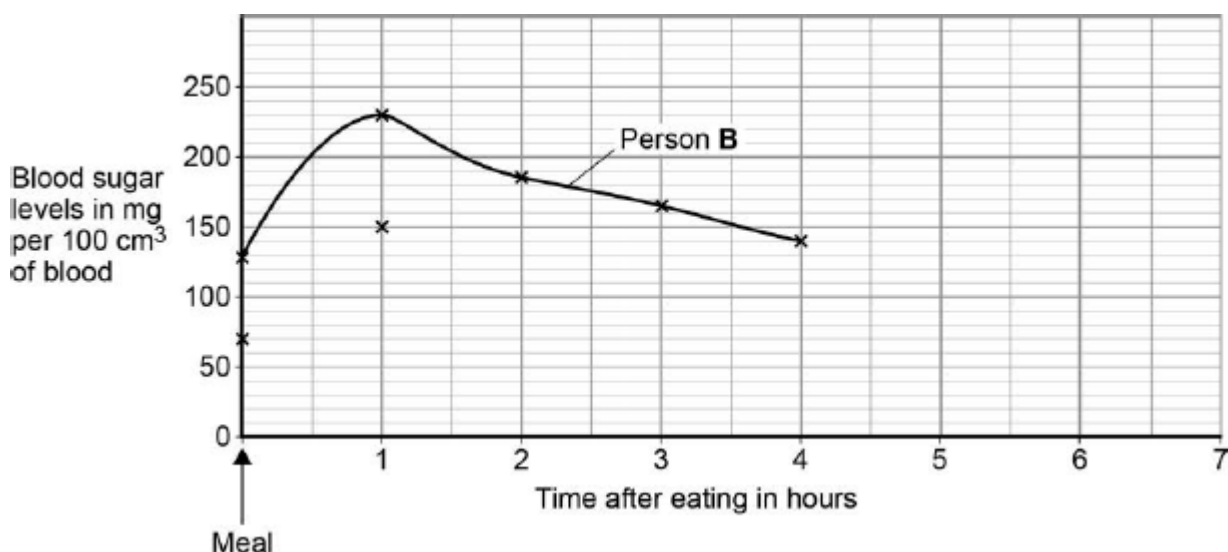
Time after eating in hours	Blood sugar levels in mg per 100 cm ³ of blood	
	Person A	Person B
0	70	130
1	150	230
2	90	185
3	80	165
4	75	140

Use data from the table above to complete the graph in the figure below.

Plot the points for person **A**.

The first two points have been plotted for you.

Draw a line through all the points.



(3)

- (c) How long after the meal is person **B**'s insulin production at its peak?

.....

(1)

- (d) What is the greatest **decrease** in the blood sugar level of person **B** in an hour?

.....

Decrease = mg per 100 cm³

(2)

- (e) Estimate how long after eating the meal it will take for person **B**'s blood sugar level to return to the level before the meal.

Show your working on the figure above.

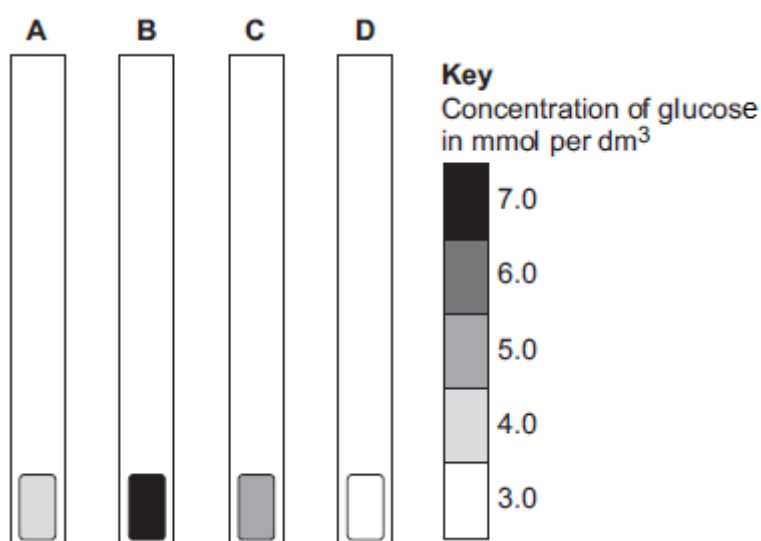
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(2)
(Total 9 marks)

Q3. Blood glucose concentration in humans must be kept between 4.4 and 6.1 mmol per dm³.

Four students, **A**, **B**, **C** and **D**, tested their blood glucose concentration with glucose testing strips.

The diagram shows the results of their tests and the key from the test strip bottle.



- (a) (i) Which student, **A**, **B**, **C** or **D**, has diabetes and has eaten a large piece of cake?

(1)

- (ii) Which student, **A**, **B**, **C** or **D**, is in most need of eating carbohydrates?

(1)

- (iii) Which student, **A**, **B**, **C** or **D**, has a healthy blood glucose concentration?

(1)

- (b) (i) Name the hormone that people with diabetes inject to prevent their blood glucose concentration from becoming too high.

.....

(1)

- (ii) Blood glucose concentration is monitored in the body.

Which organ monitors blood glucose concentration?

Draw a ring around the correct answer.

brain

liver

pancreas

(1)
(Total 5 marks)

Q4. Diabetes is a disease in which the concentration of glucose in a person's blood may rise to fatally high levels.

Insulin controls the concentration of glucose in the blood.

- (a) Where is insulin produced?

Draw a ring around **one** answer.

gall bladder

liver

pancreas

(1)

- (b) People with diabetes may control their blood glucose by injecting insulin.

- (i) If insulin is taken by mouth, it is digested in the stomach.

What type of substance is insulin?

Draw a ring around **one** answer.

carbohydrate

fat

protein

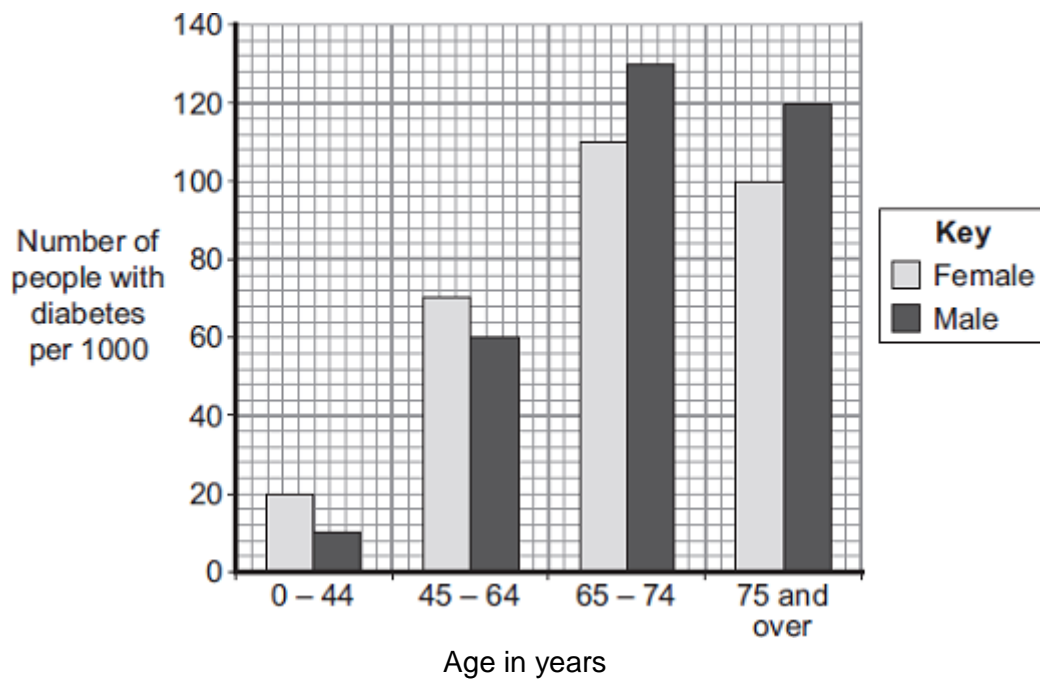
(1)

- (ii) Apart from using insulin, give **one** other way people with diabetes may reduce their blood glucose.

.....

(1)

- (c) The bar chart shows the number of people with diabetes in different age groups in the UK.



- (i) Describe how the number of males with diabetes changes between the ages of 0 – 44 years and 75 years and over.

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.....

(3)

- (ii) Compare the number of males and females with diabetes:

between the ages of 0 and 64 years

.....

.....

.....

over the age of 65 years.

.....

.....

.....

(2)
(Total 8 marks)

Q5. Type 1 diabetes develops when the body does not produce enough insulin.

- (a) Which organ produces insulin?

.....

(1)

- (b) One treatment for diabetes is to inject insulin.

The table gives the properties of four different types of insulin, **A**, **B**, **C** and **D**.

Type of insulin	Time taken for the insulin to begin to work in minutes	Time taken for insulin to reach maximum concentration in the blood in minutes	Time when insulin is no longer effective in hours
A	15-20	30-90	3-4
B	30-60	80-120	4-6
C	120-240	360-600	14-16
D	240-360	600-960	18-20

- (i) Some people with diabetes need to inject insulin just before a meal to stop a big increase in blood sugar concentration.

Which type of insulin, **A**, **B**, **C** or **D**, should these people with diabetes inject just before a meal?

.....

Give the reason for your answer.

.....

.....

(2)

- (ii) A person with diabetes is told to inject type **B** insulin immediately after breakfast at 09.00.
The person with diabetes is told to then inject a second type of insulin at lunchtime at 12.00.
The second type of insulin should keep the blood sugar level under control for the rest of the 24 hours.

Which type of insulin, **A**, **C** or **D**, should this person with diabetes inject at lunchtime?

.....

Give the reason for your answer.

.....

.....

(2)

- (iii) Apart from injecting insulin, give **one** other way in which Type 1 diabetes can be controlled.

.....

(1)

(Total 6 marks)

Q6. (a) **List A** gives the names of three hormones.

List B gives information about the three hormones.

Draw a line from each substance in **List A** to the correct information in **List B**.

List A Hormone	List B Information
FSH	Used in some contraceptive pills to stop eggs maturing
LH	Used as a fertility drug to make eggs mature
Oestrogen	Causes the lining of the womb to break down
	Stimulates the release of eggs in IVF

(3)

- (b) The table gives information about three methods of giving hormones to stop a woman becoming pregnant.

	The 'pill'	The 'patch'	The 'implant'
How the hormone is given	Swallowed each day for 21 days out of every 28 days.	Stuck onto the skin. Each patch lasts three weeks. There is a one week gap between each patch.	Needs an operation to put it under the skin. Lasts for up to 5 years.

Use the information in the table to answer these questions.

- (i) Which of the three methods is likely to be the most reliable?

.....

(1)

- (ii) Explain why you chose this method.

.....

.....

(1)

- (iii) Give **one** disadvantage of the method you have chosen.

.....

(1)
(Total 6 marks)

Q7. Hormones control the menstrual cycle.

- (a) Name **two** of the hormones involved in the menstrual cycle.

1

2

(2)

- (b) Hormones are used in some types of contraception.

Complete the sentence.

When used as contraceptives, hormones stop becoming mature.

(1)

- (c) There are several ways of using hormones as contraceptives.

These include:

- taking a contraceptive pill each day for 21 days of the menstrual cycle
- using a contraceptive implant.

The contraceptive implant is put under the skin of a woman's arm.

The implant releases contraceptive hormones for three years before the implant needs to be replaced.

- (i) Suggest **one** advantage of using this implant rather than taking contraceptive pills.

.....

.....

(1)

- (ii) Suggest **one** disadvantage of using this implant rather than taking contraceptive pills.

.....

.....

(1)

(Total 5 marks)

Q8. Our bodies control the concentration of glucose in the blood.

Draw a ring around the correct answer to complete each sentence.

- (a) The concentration of glucose in the blood is controlled by a

hormone called

carbohydrase.

insulin.

protease.

(1)

- (b) This hormone is produced by the

intestine.

stomach.

pancreas.

(1)

- (c) If the body does not produce enough of this hormone,

the person develops

diabetes. cystic fibrosis. Huntington's disease.
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(1)
(Total 3 marks)

Q9. Diabetes is a disease in which blood glucose (sugar) concentration may rise more than normal.

(a) Which organ in the body monitors this rise in blood sugar?

Draw a ring around your answer.

liver

pancreas

stomach

(1)

(b) One way of treating diabetes is by careful attention to diet.

Chart 1 shows the recommended diet for a person with diabetes.

Chart 2 shows a diet for a person without diabetes.

Chart 1 Person with diabetes

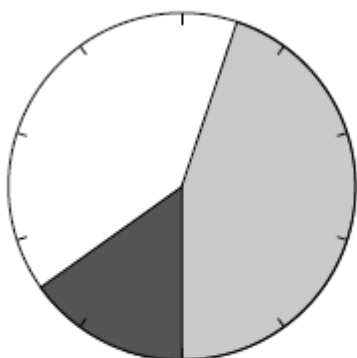
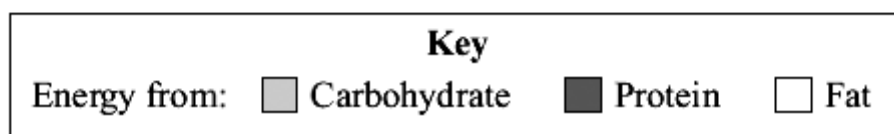
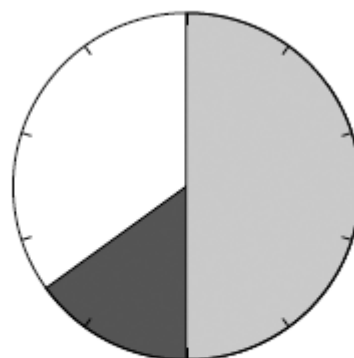


Chart 2 Person without diabetes



How is the recommended diet of a person with diabetes different from the diet of a person without diabetes?

Use information from the charts.

Tick (✓) **two** box.

The diabetic should get more energy from fat.

☐

The diabetic should get more energy from protein.

☐

The diabetic should get less energy from carbohydrate.

☐

The diabetic should get less energy from protein.

☐

(2)

(c) Other than diet, give **one** way in which diabetes may be treated.

.....

.....

(1)

(Total 4 marks)

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