

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	Gold Level
Booklet	Question Paper 1

Time Allowed: 50 minutes

Score: / 48

Percentage: /100

Grade Boundaries:

Q1. People with Type 1 diabetes cannot control the concentration of glucose in their blood.

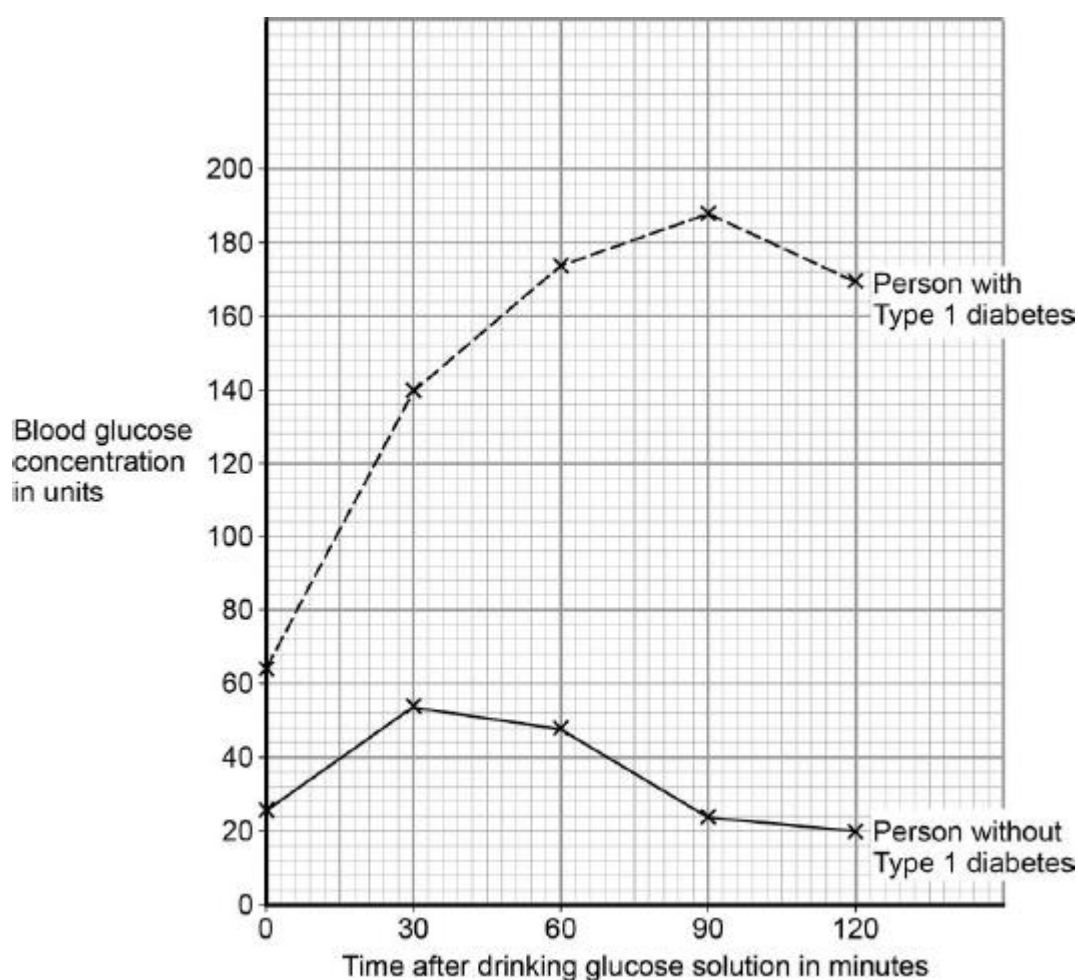
This is because they do **not** produce the hormone insulin.

The same concentration and volume of glucose solution is given to two people.

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

Figure 1 shows how the blood glucose concentration of these people changes after they each drink a glucose solution.

Figure 1



- (a) The blood glucose concentration increases at a faster rate in the person with diabetes compared to the person without diabetes.

Calculate how much faster the rate of increase in blood glucose concentration is in the person with diabetes.

Give the rate of increase for the first 30 minutes after drinking the glucose solution.

Give your answer in units / h.

.....
.....

..... Units / h

(2)

- (b) The blood glucose concentration of the person without diabetes starts to change 30 minutes after drinking the glucose solution.

Explain why the blood glucose concentration changes.

.....
.....
.....
.....

(2)

- (c) People with diabetes should try to keep their blood glucose concentration within the same range as a person without diabetes.

Most people with Type 1 diabetes regularly check their blood glucose concentration using a meter, as shown in **Figure 2**.

The meter reading is used to estimate how much insulin they need to inject.

Figure 2

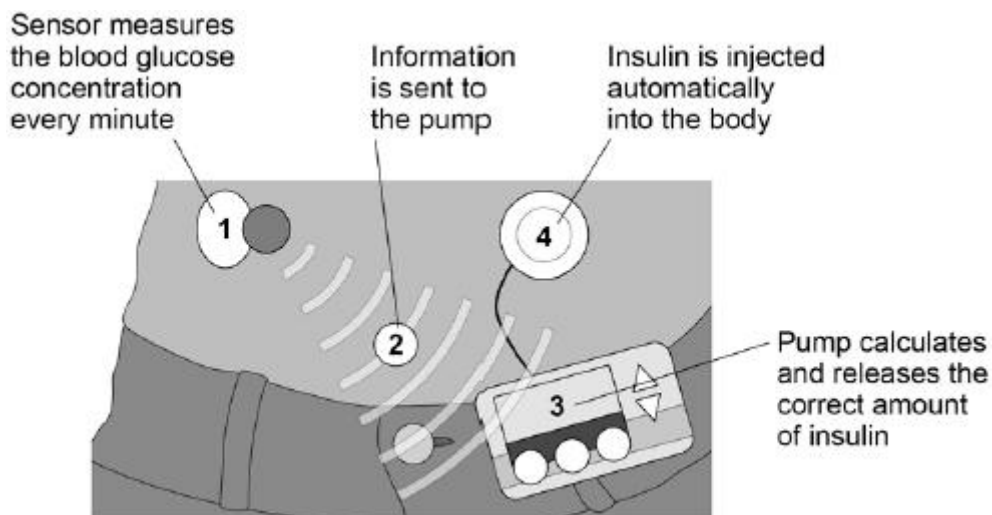


© Vincente Barcel/Hemera/Thinkstock

Figure 3 shows a new system.

It is connected to the person all the time.

Figure 3



The new system:

- gives better control of blood glucose concentration
- reduces the number of times the glucose concentration falls too low.

Evaluate the two systems as methods for controlling blood glucose concentrations for people with Type 1 diabetes.

Give a justified conclusion to your evaluation.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4)

- (d) How does the body respond if slightly too much insulin is injected into the body.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(5)
(Total 13 marks)

Q2. Hormones are released from glands.

- (a) Which gland produces hormones to control other glands in the endocrine system?

Tick **one** box.

Adrenal

☐

Ovary

☐

Pituitary

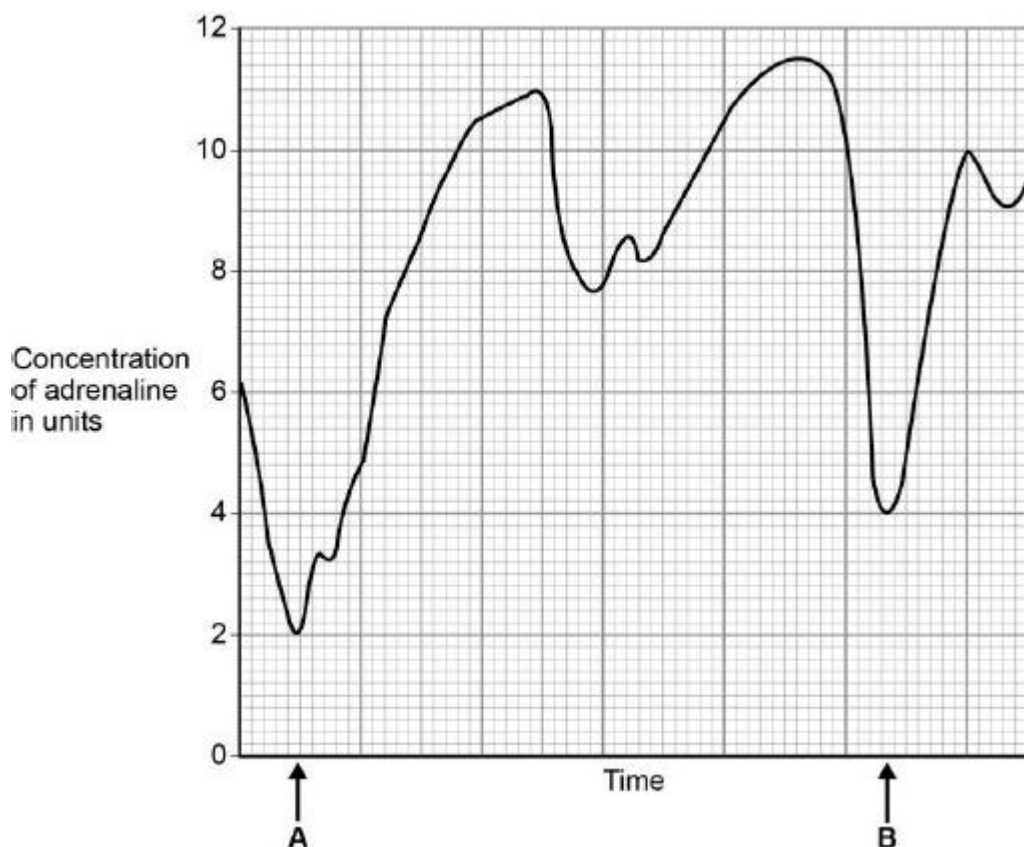
☐

Thyroid

☐

(1)

- (b) The figure below shows the level of adrenaline in a man's bloodstream while he was watching a 12-minute film.



Calculate the percentage increase in adrenaline after point **B**.

.....

.....

.....

.....

Percentage increase in adrenaline =

(2)

- (c) Suggest why the percentage increase in adrenaline after point **B** is different from the percentage increase after point **A**.

.....

.....

.....

.....

(2)

- (d) Adrenaline causes changes in the body to prepare for a 'fight or flight' response.

What changes in the man's body are caused by adrenaline?

.....

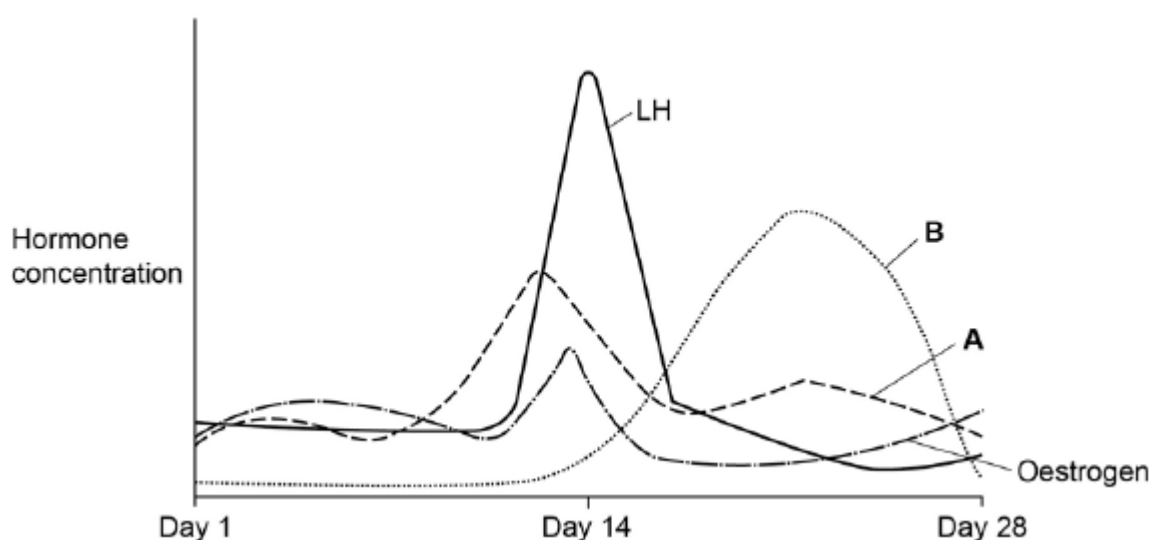
.....

.....

.....

(2)
(Total 7 marks)

Q3. The figure below shows how the concentrations of the reproductive hormones in the blood of a woman change over 28 days.



- (a) Name hormones **A** and **B**.

A

B

(2)

- (b) Use information from the figure above to explain what happens on Day 14.

.....

.....

.....

.....

(2)

- (c) In Vitro Fertilisation (IVF) treatment can be used to help women become pregnant.

IVF uses some of the hormones shown in the figure above.

Explain why IVF increases the chance of some women becoming pregnant.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(6)

(Total 10 marks)

Q4. *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Homeostasis keeps conditions in the body relatively constant.

The amount of water in the body is controlled by homeostasis.

Kidney function is controlled by a gland in the brain.

Describe how the water content of the blood is controlled.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total 6 marks)

Q5.Phenylketonuria (PKU) is an inherited condition. PKU makes people ill.

(a) PKU is caused by a recessive allele.

(i) What is an allele?

.....

.....

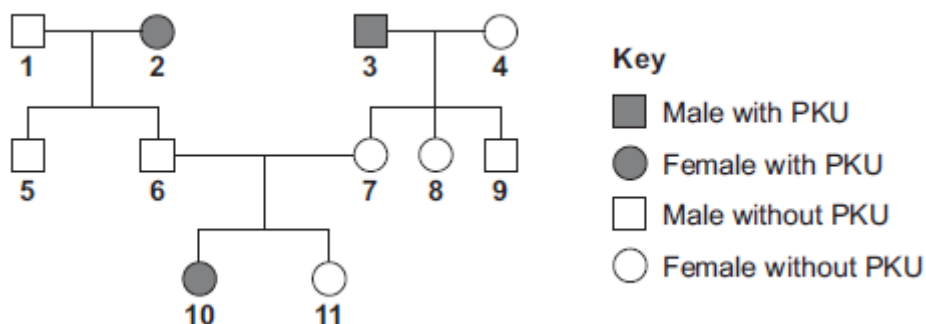
(1)

(ii) What is meant by recessive?

.....

(1)

- (b) The diagram below shows the inheritance of PKU in one family.



- (i) Give **one** piece of evidence from the diagram that PKU is caused by a recessive allele.

.....

.....

(1)

- (ii) Persons **6** and **7** are planning to have another child.
Use a genetic diagram to find the probability that the new child will have PKU.

Use the following symbols in your answer:

N = the dominant allele for **not** having PKU

n = the recessive allele for PKU.

Probability =

(4)

- (c) Persons **6** and **7** wish to avoid having another child with PKU.

A genetic counsellor advises that they could produce several embryos by IVF treatment.

- (i) During IVF treatment, each fertilised egg cell forms an embryo by cell division.

Name this type of cell division.

.....

(1)

- (ii) An embryo screening technique could be used to find the genotype of each embryo.

An unaffected embryo could then be placed in person 7's uterus.

The screening technique is carried out on a cell from an embryo after just three cell divisions of the fertilised egg.

How many cells will there be in an embryo after the fertilised egg has

divided three times?

(1)

- (iii) During embryo screening, a technician tests the genetic material of the embryo to find out which alleles are present.

The genetic material is made up of large molecules of a chemical substance.

Name this chemical substance.

.....

(1)

- (d) Some people have ethical objections to embryo screening.

- (i) Give **one** ethical objection to embryo screening.

.....

(1)

- (ii) Give **one** reason in favour of embryo screening.

.....

(1)

(Total 12 marks)

Save My Exams! – The Home of Revision

For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/