



Additional Assessment Materials
Summer 2021

Pearson Edexcel GCSE in Biology (1BI0)
Foundation

Resource Set Topic 7: Animal Coordination,
Control and Homeostasis

Questions

(Public release version)

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General guidance to Additional Assessment Materials for use in 2021

Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an **optional** part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

1 Insulin is produced by an endocrine gland and is transported in the blood.

(a) (i) Which row shows the endocrine gland and the target organs for insulin?

(1)

	endocrine gland	target organs
<input type="checkbox"/> A	adrenal	liver and muscles
<input type="checkbox"/> B	adrenal	small and large intestines
<input type="checkbox"/> C	pancreas	liver and muscles
<input type="checkbox"/> D	pancreas	small and large intestines

(ii) Which part of the blood transports insulin to its target organs?

(1)

- A plasma
- B red blood cells
- C white blood cells
- D platelets

(b) Figure 1 shows the blood glucose and blood insulin concentration for a healthy person during one day.

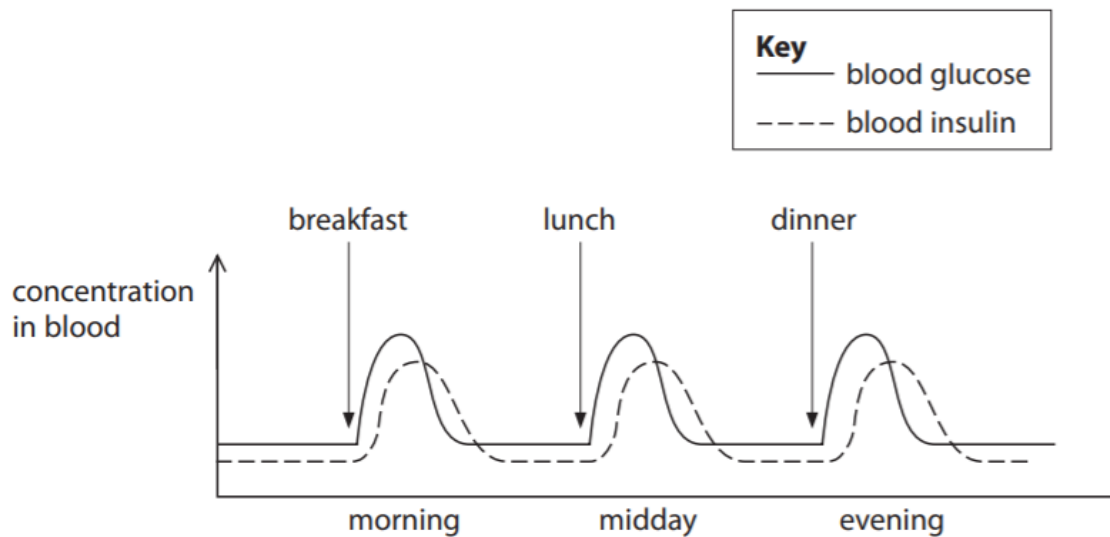


Figure 1

The blood glucose concentration increases after a meal.

Explain why the blood glucose concentration then decreases.

(2)

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(c) State **one** cause of type 1 diabetes.

(1)

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(d) Explain how controlling the diet can be used to treat type 2 diabetes.

(2)

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(e) A scientist is planning to test a new treatment for type 2 diabetes.

She selects 300 volunteers who have type 2 diabetes.

State **two** other factors that the scientist should consider when selecting the 300 volunteers.

(2)

1

2

7 Figure 16 shows the urinary system of a human.

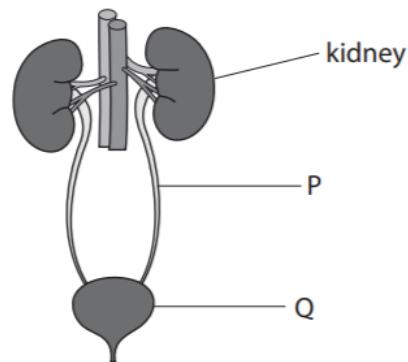


Figure 16

(a) Name the structures labelled P and Q.

(2)

P.....

Q.....

(b) The kidney contains nephrons.

Figure 17 shows the concentration of glucose and protein found in the blood plasma and in the filtrate inside a nephron.

	concentration in the blood plasma	concentration in the filtrate in the nephron
glucose	1 mg per cm^3	1 mg per cm^3
protein	47 g per dm^3	0 g per dm^3

Figure 17

(i) Explain the difference in the concentration of protein in the blood plasma and in the filtrate in the nephron.

(2)

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(ii) Explain how glucose moves from the blood plasma into the nephron.

(3)

2 Figure 3 shows the positions of the endocrine glands in a woman and a man.

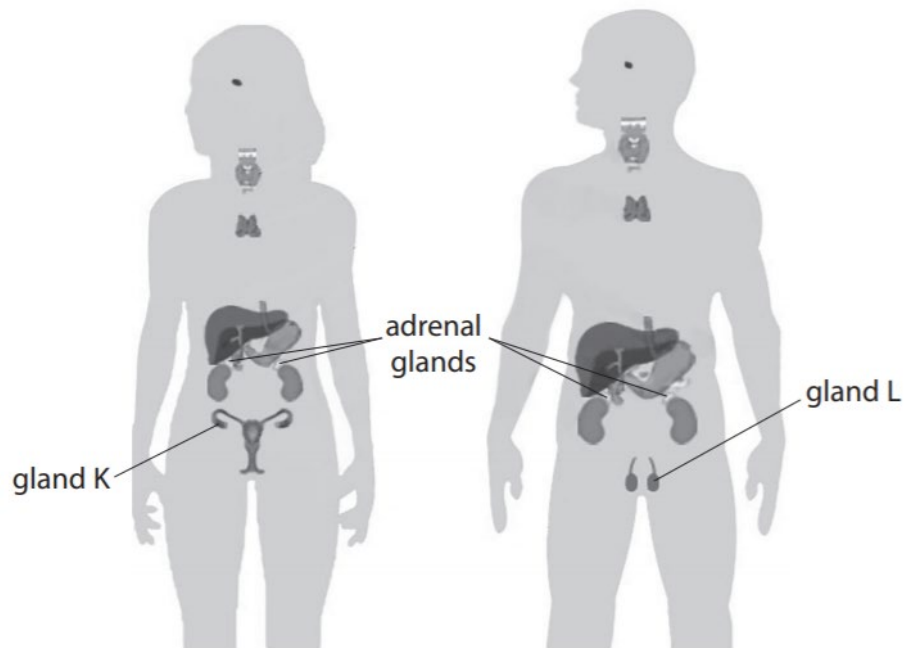


Figure 3

(a) Draw **one** straight line from each hormone to the effect of the hormone on the body. (2)

hormone	effect of hormone
	● increases glucose levels
hormone from gland K in the woman ●	● prepares the uterus lining for a fertilised egg
	● causes facial hair to grow
hormone from gland L in the man ●	● controls the water content of the body
	● decreases sweating

(b) How is adrenalin transported from the adrenal glands to its target organs?

(1)

- A** by transpiration
- B** by osmosis
- C** dissolved in blood plasma
- D** carried by red blood cells

(c) What name is given to the process of maintaining the internal body conditions?

(1)

- A** respiration
- B** diffusion
- C** digestion
- D** homeostasis

(d) Figure 4 shows the concentration of glucose in the blood of a person.

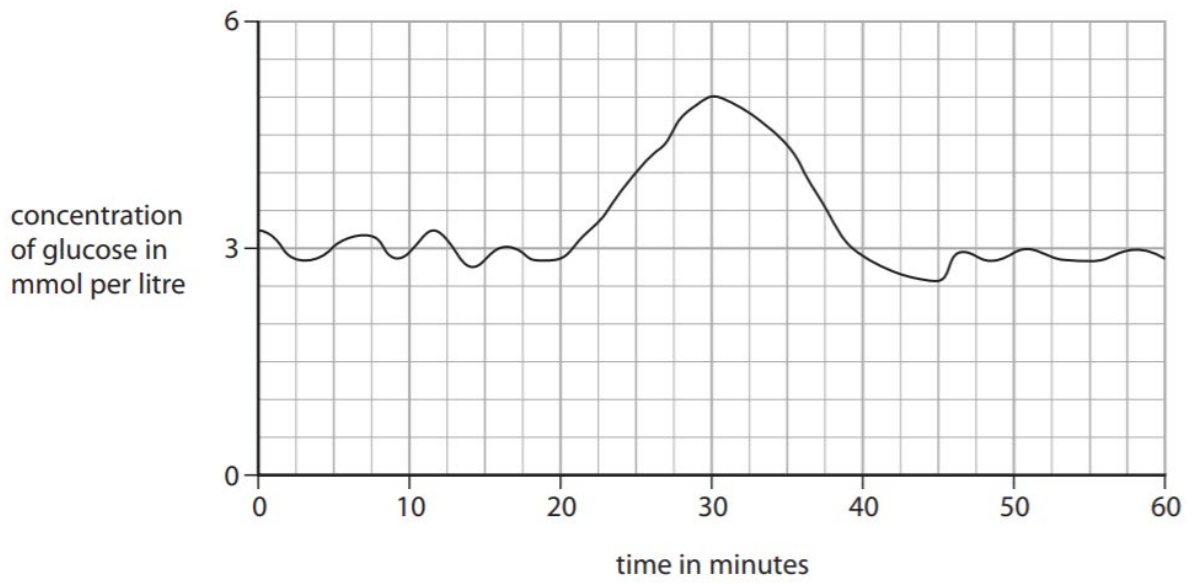


Figure 4

(i) Describe the trends shown in Figure 4 from 0 minutes to 30 minutes.

(2)

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(ii) Explain why the concentration of glucose decreases from 30 minutes to 40 minutes.

(2)

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10 A student was investigating the effect of sweating.

The student set up two conical flasks each with a thermometer as shown in Figure 18.

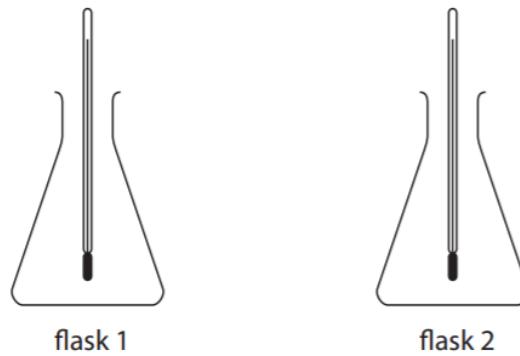


Figure 18

Flask 1 was covered in **wet** tissue paper.

Flask 2 was covered with **dry** tissue paper.

Hot water was added to each of the flasks.

The temperature of the water in each flask was recorded every minute for 10 minutes.

(a) State **two** variables that would need to be controlled in this investigation.

(2)

1

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2

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(b) The results of this investigation are shown in Figure 19.

time in minutes	flask 1 (wet tissue paper) temperature in °C	flask 2 (dry tissue paper) temperature in °C
1	98	98
2	82	91
3	71	84
4	60	76
5	50	69
6	39	61
7	31	56
8	22	49
9	22	42
10	22	37

Figure 19

(i) Calculate the rate of temperature change in flask 1 from 1 to 8 minutes.

(2)

..... °C per minute

(ii) Compare the trends shown in the data for flask 1 and flask 2.

(2)

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(c) Explain how sweating helps to cool the body.

(2)

(d) Which part of the brain controls internal body temperature?

(1)

- A** cerebellum
- B** medulla oblongata
- C** hypothalamus
- D** pituitary gland

(e) Explain why it is important to control the internal temperature of the human body.

(2)

- 5 (a) (i) Which row of the table shows the endocrine gland and hormone involved in the control of blood glucose concentration?

(1)

	endocrine gland	hormone
<input type="checkbox"/> A	ovary	oestrogen
<input type="checkbox"/> B	ovary	insulin
<input type="checkbox"/> C	pancreas	oestrogen
<input type="checkbox"/> D	pancreas	insulin

- (ii) State a target organ for the hormone that controls blood glucose concentration.

(1)

- (b) People with a high BMI are more likely to develop type 2 diabetes.
Figure 11 shows the mass, height and BMI for two people.

person	mass in kilograms	height in metres	BMI
A	110	2.0	?
B	85	1.5	38

Figure 11

- (i) Use the formula to calculate the BMI for person A

$$\text{BMI} = \frac{\text{mass}}{\text{height}^2}$$

(2)

(ii) Person B develops type 2 diabetes.

Describe **two** lifestyle changes person B should make to help to control their blood glucose concentration.

(2)

1.....

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2.....

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6 (a) Figure 13 shows a kidney nephron.

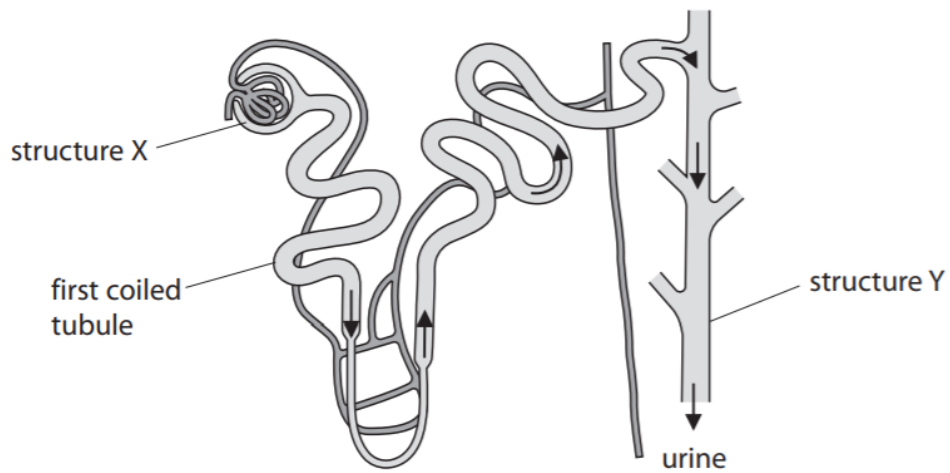


Figure 13

(i) Structure X is the

(1)

- A glomerulus
- B Bowman's capsule
- C collecting duct
- D capillary

(ii) Figure 14 shows the concentration of glucose in the filtrate in the nephron.

filtrate	mean concentration of glucose in millimoles per litre
filtrate in the start of first coiled tubule	6
filtrate in the end of first coiled tubule	0

Figure 14

Explain why the concentration of glucose changes as it moves through the first coiled tubule.

(2)

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(iii) Name the structure that carries urine from the kidney to the bladder.

(1)

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(b) The concentration of protein in urine from person A and person B was measured each year from 2015 to 2019.

Person A had healthy kidneys. Person B had kidney disease.

year	concentration of protein in urine in arbitrary units	
	person A (with healthy kidneys)	person B (with kidney disease)
2015	2	25
2016	4	37
2017	5	57
2018	4	79
2019	3	106

Figure 15

Use the data in Figure 15 to compare the changes in the concentration of protein in the urine from person A and person B.

(2)

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(c) Person B needs a kidney transplant.
Person B has a twin sister.

Explain why this twin sister could be a suitable kidney donor for Person B.

(2)

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7 People produce sweat when they are hot.

Sweat consists of substances dissolved in water.

Figure 16 shows the concentration of dissolved substances in the sweat of two patients in a hospital.

substance in sweat	concentration in mmol per dm ³	
	patient A	patient B
urea	8.0	32.0
glucose	0.5	0.4
sodium ions	40.0	36.0
chloride ions	35.0	32.0

Figure 16

(a) (i) Calculate the ratio of the concentration of urea in the sweat of patient A to the concentration of urea in the sweat of patient B.

Give your answer in its simplest form.

(2)

(ii) Describe how urea is produced in the body.

(2)

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(iii) The blood of patient B has a very high concentration of urea.

Which organ removes most urea from the blood?

(1)

- A** kidney
- B** lung
- C** liver
- D** stomach

(b) The human body can regulate the temperature of the blood.

(i) Which part of the brain controls body temperature?

(1)

- A** cerebral hemispheres
- B** medulla oblongata
- C** cerebellum
- D** hypothalamus

TOTAL = 63 MARKS