Q1. Homeostasis controls the internal conditions of the body.

(a) Explain how blood glucose levels are controlled in the body of someone who does **not** have diabetes.

.....

.....

.....

.....

.....

.....

.....

.....

(4)

(b) Compare how each type of diabetes is caused.

Suggest how each type of diabetes can be treated.

.....

.....

.....

.....

.....

.....

.....

.....

(4)

(c) Look at the table below.

Population of UK in 2015	6.5×10^7
Number of people diagnosed with diabetes	3.45×10^6

Estimated number of people with undiagnosed diabetes	5.49×10^5

Calculate the percentage (%) of the UK population estimated to have diabetes.

You should include both diagnosed and undiagnosed people in your calculation.

Give your answer to 2 significant figures.

.....

.....

.....

.....

.....

Estimated percentage of population with diabetes = ... %

(3)

(d) A urine test can be used to check for the presence of glucose in the urine.

Diabetes can also be diagnosed with a blood test to measure the concentration of blood glucose.

Suggest why a blood test is more reliable than a urine test.

.....

.....

(1)

(e) A blood test called the glucose tolerance test checks how well the body processes glucose.

Concentrations of glucose in the blood are measured before and after drinking a glucose drink.

Patients are not allowed to eat food for 8 hours before the glucose tolerance test.

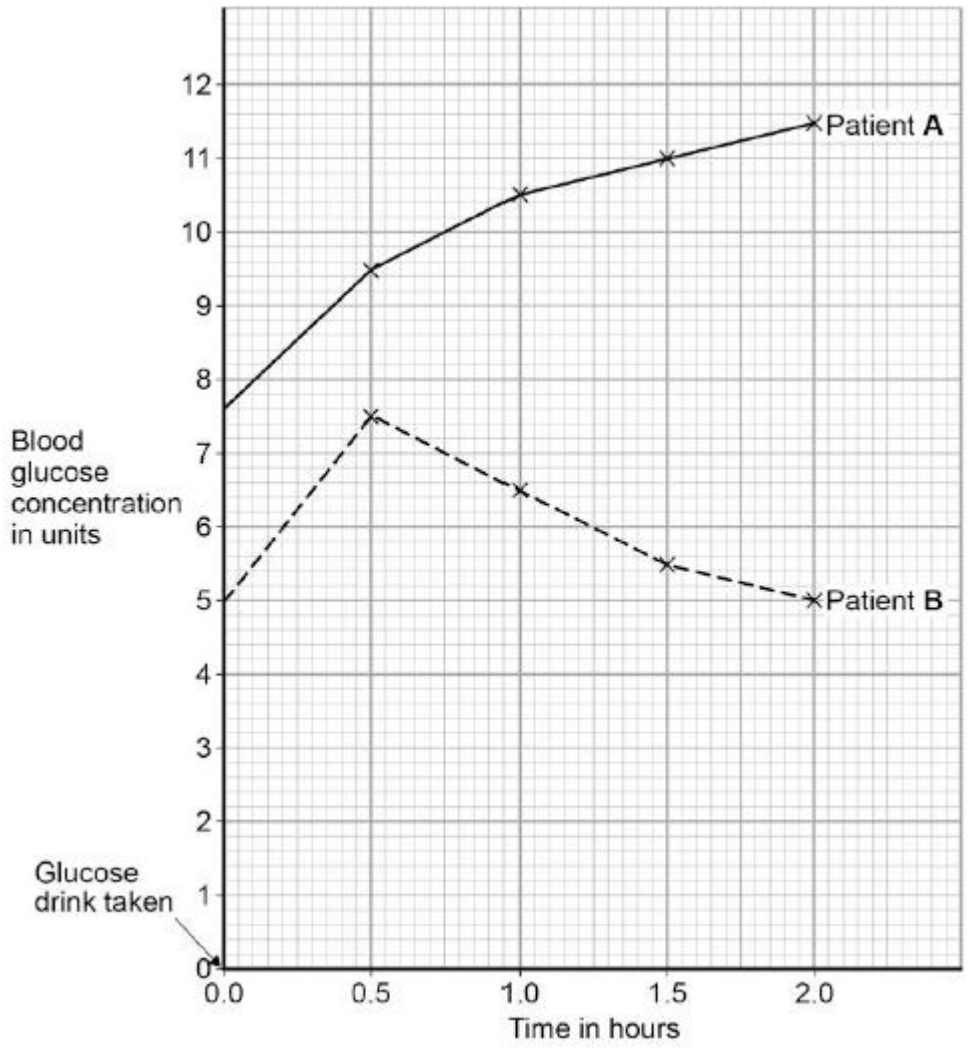
Suggest why patients are **not** allowed to eat for 8 hours before the test.

.....

.....

(1)

(f) The diagram below shows the results of a glucose tolerance test for two patients, **A** and **B**.



Which patient has diabetes?

Justify your answer.

Patient .....

Justification .....

.....

.....

.....

(2)

(Total 15 marks)

Q2.(a) Which organ in the body monitors the concentration of glucose (sugar) in the blood?

.....

(1)

(b) In a healthy person, insulin prevents high levels of glucose in the blood.
To make insulin, cells in the pancreas need amino acids.

Amino acids cannot be stored in the body.

Describe, as fully as you can, what happens to amino acids that cannot be stored in the body.

.....

.....

.....

.....

.....

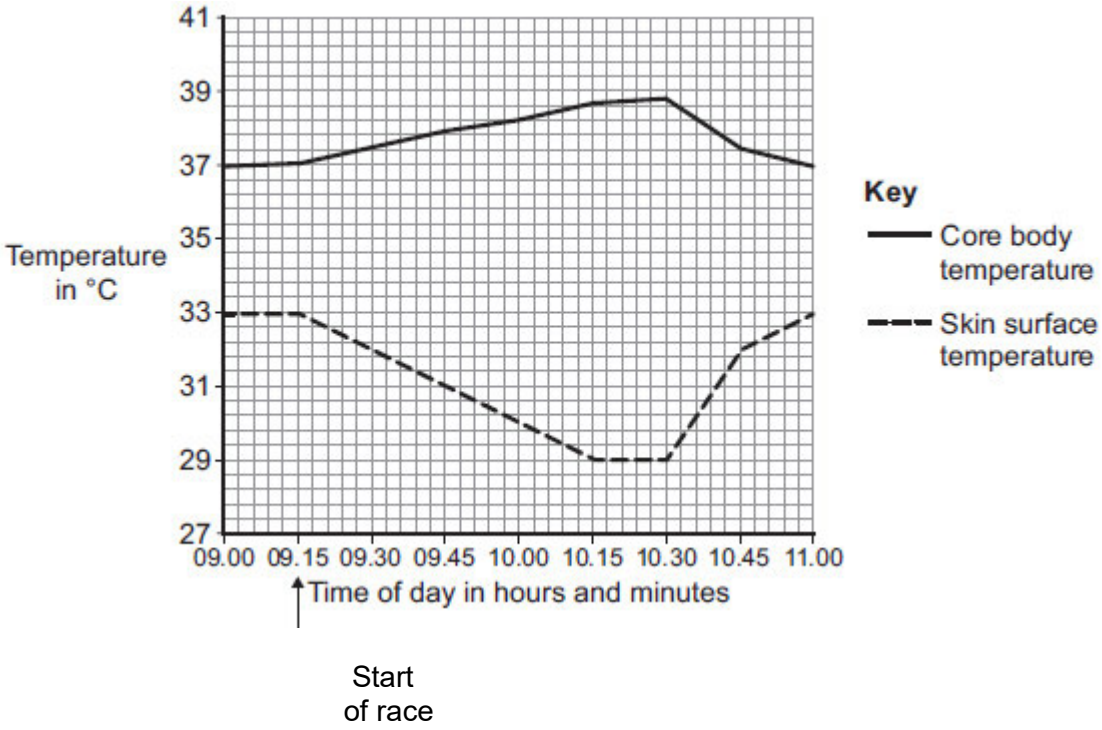
.....

.....

.....

(3)
(Total 4 marks)

Q3. The graph shows the core body temperature and the skin surface temperature of a cyclist before, during and after a race.



(a) (i) When the cyclist finished the race, his core body temperature started to decrease.

How long did the race last?

.....

(1)

(ii) Describe and explain the different patterns shown in the core body temperature and skin surface temperature between 09.15 and 10.15.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(6)

(iii) After 10.30, the core body temperature decreased.

Explain how changes in the blood vessels supplying the skin caused the skin surface temperature to increase.

.....

.....

.....

.....

.....

.....

(2)

(b) During the race, the cyclist's blood glucose concentration began to decrease.

Describe how the body responds when the blood glucose concentration begins to decrease.

.....

.....

.....

.....

.....

.....

.....

.....

(3)
(Total 12 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. It is important to remove waste products from our bodies.

Healthy kidneys help to keep our internal environment constant.

(a) Describe how a healthy kidney produces urine.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(5)

(b) A child has kidney failure and is treated with dialysis.

Before the dialysis starts, the doctor measures the concentration of urea and glucose in the child's blood.

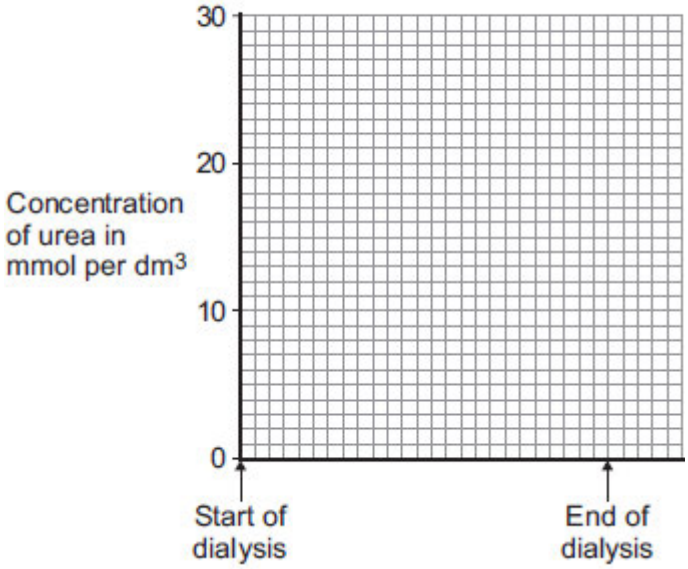
The table shows the results.

	Concentration in the blood before dialysis starts in mmol per dm^3
Urea	28
Glucose	6

The child has a normal blood glucose concentration.

(i) Sketch a graph on **Figure 1** to suggest what will happen to the concentration of urea in the blood during dialysis.

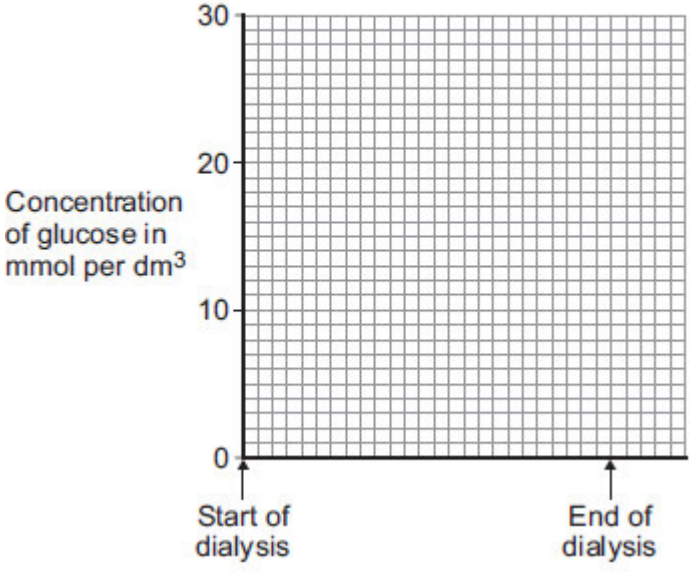
Figure 1



(1)

(ii) Sketch a graph on **Figure 2** to suggest what will happen to the concentration of glucose in the blood during dialysis.

Figure 2



(1)

(c) (i) Another way of treating kidney failure is with a kidney transplant.

A transplanted kidney can be rejected.

Explain why the new kidney may be rejected.

.....

.....

.....

.....

.....

.....

(3)

(ii) Describe **one** way in which doctors try to prevent kidney rejection.

.....

.....

(1)

(Total 11 marks)

Q6. Endocrine glands produce hormones.

(a) Hyperthyroidism is caused by an overactive thyroid gland.

Suggest what would happen in the body of a person with hyperthyroidism.

.....

.....

.....

.....

.....

.....

(3)

(b) Describe the roles of FSH and LH in the menstrual cycle.

.....

.....

.....

.....

(2)

(c) The combined pill is a contraceptive that contains progesterone **and** oestrogen.

The 'mini-pill':

- is a contraceptive that **only contains** the progesterone hormone
- has to be taken at the same time each day to prevent pregnancy.

The success rate of the mini-pill in preventing pregnancy is lower than that of the combined pill.

Explain why missing a dose of the mini-pill would reduce the success rate of the mini-pill.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4)
(Total 9 marks)