1. Nov/2022/Paper_41/No.8

(a) Fig. 8.1 is a diagram of a kidney nephron.

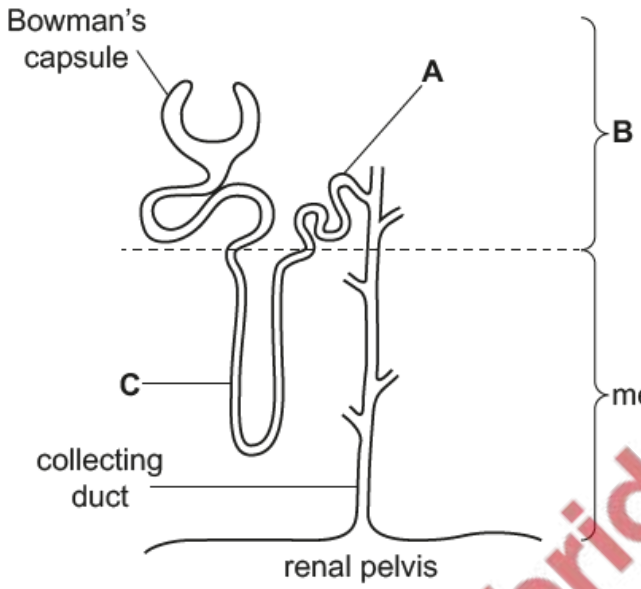

Fig. 8.1

With reference to Fig. 8.1, name **A**, **B** and **C**.

A .....

B .....

C .....

[3]

(b) Antidiuretic hormone (ADH) is involved in the maintenance of the water potential of the blood.

Fig. 8.2 shows the relationship between blood ADH concentration, urine concentration and the flow rate of urine.

The flow rate of urine is the rate of production of urine by the kidneys.

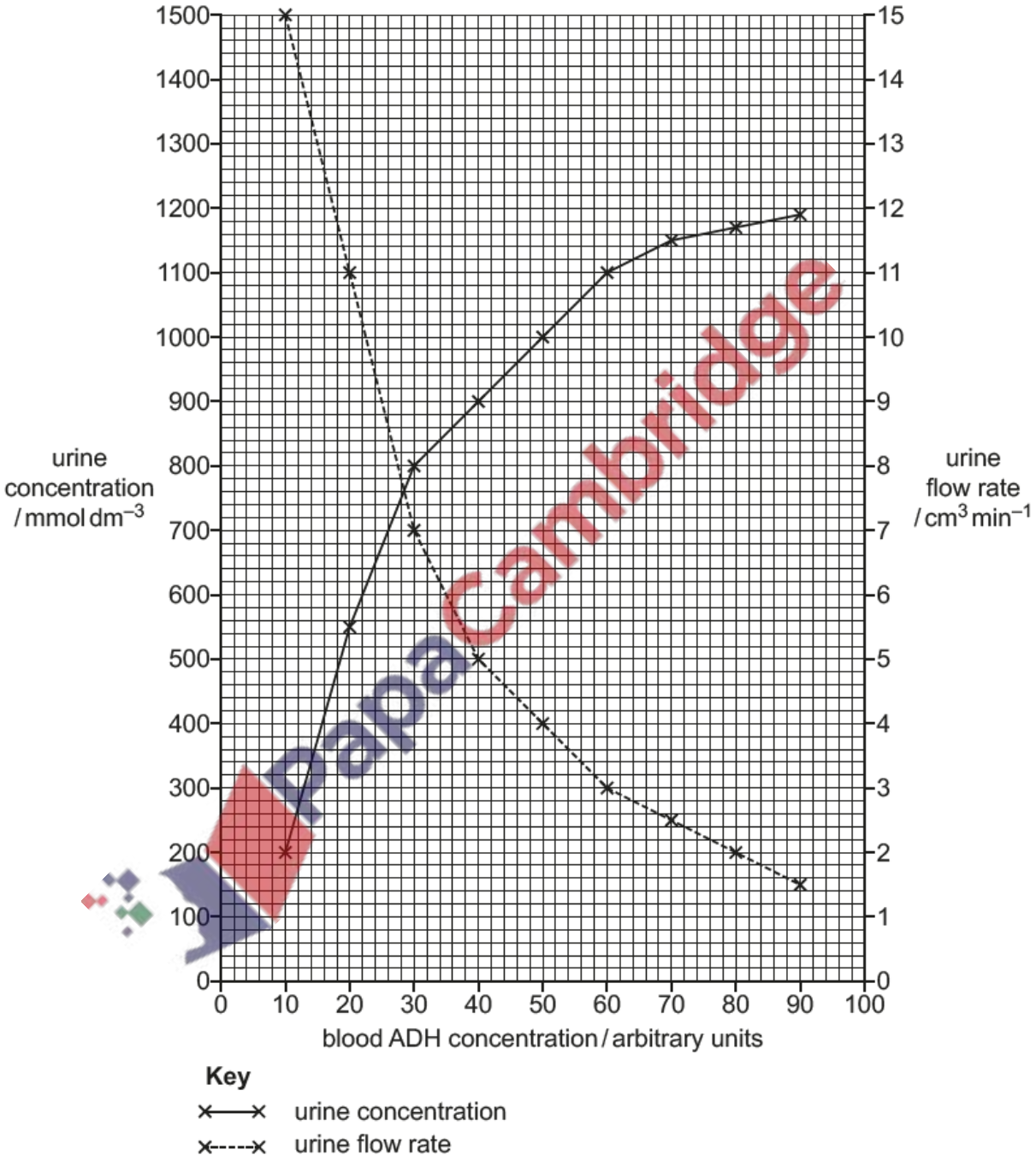

Fig. 8.2

Describe the relationships shown in Fig. 8.2.

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..... [3]

(c) Describe **and** explain the action of ADH on the cells of the collecting duct when the water potential of the blood decreases.

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..... [5]

[Total: 11]

2. Nov/2022/Paper_41/No.10

The passage below outlines homeostasis.

Complete the passage by using the most appropriate scientific terms.

Homeostasis, in mammals, is the process of keeping the ..... environment of the body in optimum conditions so that cells can function efficiently. Blood water potential, core temperature and blood glucose concentration are all factors that need to be kept at optimum values or set-point.

When a condition deviates from its set-point, a corrective mechanism is triggered. An increase in blood glucose concentration triggers processes to decrease it and vice versa. This corrective mechanism is called ..... .

The pancreas is involved in the control of blood glucose concentration. Glucose binds to ..... on the cell surface membrane of pancreatic cells. These are ..... cells, which secrete hormones such as insulin and glucagon. The two hormones have opposite effects on the blood glucose concentration. For example the action of one hormone stimulates the uptake of glucose by cells for respiration and the action of the other hormone stimulates the breakdown of ..... to glucose in the liver.

[Total: 5]

3. Nov/2022/Paper_42/No.10

(a) Glucagon has a role in the maintenance of blood glucose concentration.

Fig. 10.1 shows the relationship between blood glucose concentration and blood glucagon concentration, measured over 90 minutes in a healthy person. The person did not have any food in the three hours before the measurements were taken.

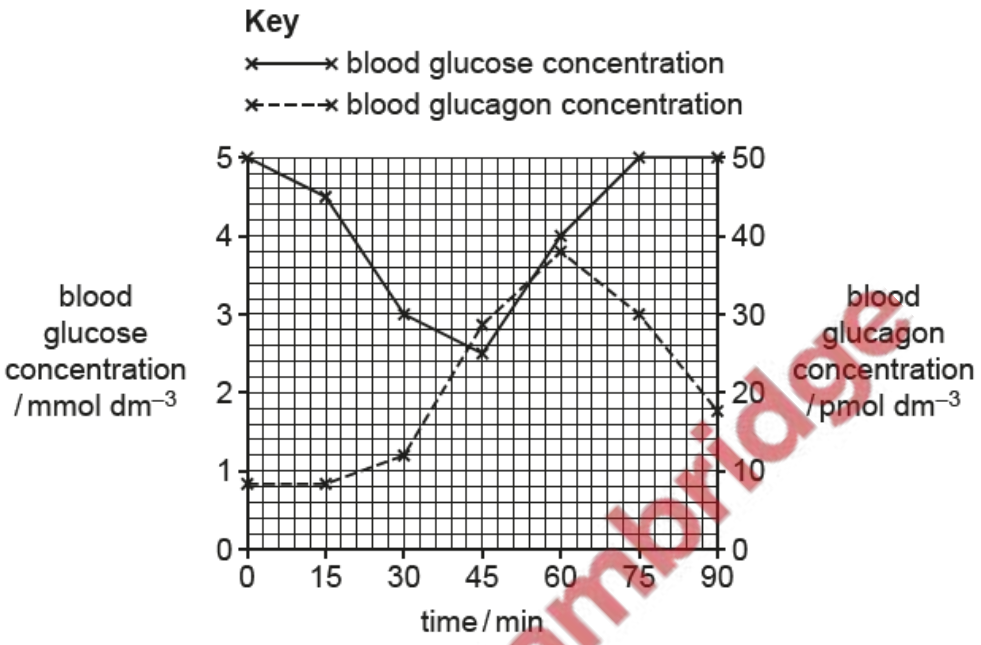

Fig. 10.1

Explain the relationship shown in Fig. 10.1.

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..... [4]

(b) The passage below outlines cell signalling.

Complete the passage by using the most appropriate scientific terms.

Cells need to interact with their environment and other cells around them. This is called cell signalling. Cells in mammals are involved in a complex system of communication with each other. For example, liver cells detect signals using receptors in their cell surface membranes. Glucagon binds to the receptors because its shape is ..... . This binding activates a ..... , leading to stimulation of the enzyme ..... . [3]

[Total: 7]