Homeostasis in mammals

Question Paper 1

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Homeostasis
Sub Topic	Homeostasis in mammals
Booklet	Theory
Paper Type	Question Paper 1

Time Allowed : **66 minutes**

Score : **/ 55**

Percentage : **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 **(a)** In mammals, the water potential of the blood is constantly monitored by osmoreceptor cells in the hypothalamus of the brain. When the water potential of the blood decreases, ADH (antidiuretic hormone) is produced by cells in the hypothalamus and released into the blood via an endocrine gland.

(i) Explain what is meant by the term *water potential*.

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.....[1]

(ii) Describe the effect on water potential of adding solute to a solution.

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.....[1]

(iii) State precisely where ADH is released into the blood.

.....[1]

(iv) The decrease in the water potential of the blood is sometimes due to the loss of water from the body of a mammal.

List **two** ways by which water may be lost from the body.

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.....[1]

(b) Describe the action of ADH on the kidney.

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.....[5]

(c) Diabetes insipidus is a condition caused by an inability to produce ADH or by the kidneys being unable to respond to ADH.

Suggest symptoms that may be experienced by a person who has diabetes insipidus.

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.....[2]

[Total: 11]

2 **(a)** Describe the structure of a kidney, including its associated blood vessels. [6]

(b) Describe the mechanisms involved in reabsorption in the proximal convoluted tubule **and** describe how the epithelial cells of the proximal convoluted tubule are adapted to carry out this process. [9]

[Total: 15]

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3 Outline, with reference to blood glucose concentration, the principles of homeostasis in mammals. [6]

[Total: 6]

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4 **(a)** Describe the part played by the proximal convoluted tubules in the functioning of the kidneys. [8]

(b) Explain how the collecting ducts in the kidneys may reduce the loss of water from the body. [7]

[Total: 15]

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5 Fig. 2.1 is a light micrograph of a small part of the pancreas.

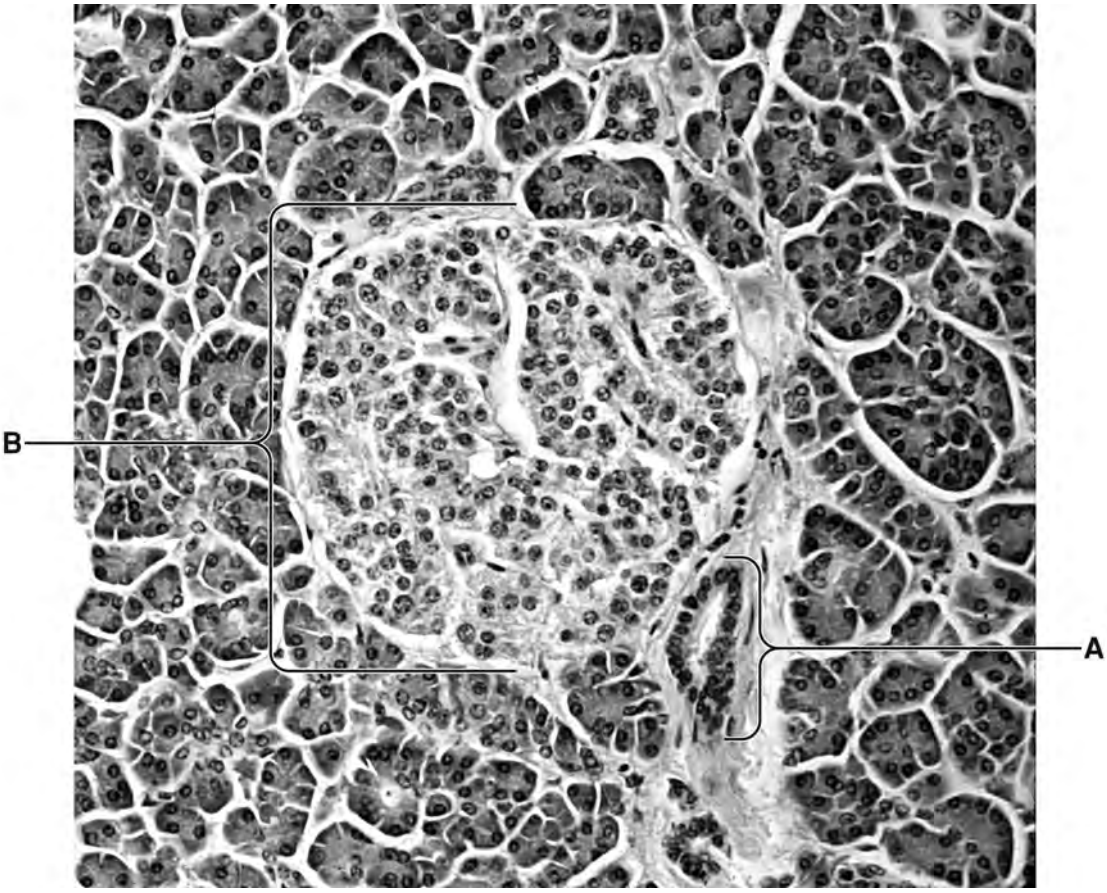

Fig. 2.1

(a) Name structures **A** and **B**.

A .....

B ..... [2]

(b) With reference to Fig. 2.1, explain why the pancreas is an *endocrine gland*.

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..... [2]

(c) Insulin and glucagon are involved in the control of blood glucose concentration. When blood glucose concentration rises, secretion of insulin increases.

Outline two ways in which insulin affects the activity of cells in the liver.

1. .....

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2. .....

..... [2]

(d) Some forms of diabetes are caused by an inability to secrete insulin and can be controlled by regular injections of insulin. Most of this insulin is now produced using genetically modified *Escherichia coli.*

Explain the advantages of using this type of insulin, rather than insulin obtained from animal sources.

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..... [2]

[Total: 8]