

GCSE Biology (9 – 1)

Urinary System and Kidney Questions

Name:

Group:

Instructions

- Read each question carefully before you begin to answer it.
- Use black ink or black ball-point pen for your answers.
- Fill in the boxes at the top of this page with your name and group.
- Attempt to answer every question in the booklet.
- Answer the questions in the spaces provided – there may be more space than you need in some answer spaces.
- Calculators may be used for this booklet.
- For any calculations, you **must** show all your working.
- Any and all drawings or graphs should be completed in pencil.



For markers use	
Question	Mark
1	/4
2	/15
3	/14
4	/13
5	/14
6	/8
Total	/68
%	
Grade	

Information

- The maximum mark for this paper is 68 marks.
- The marks for each question are shown in brackets.
- Please be aware that good English and clear presentation are required in your answers.

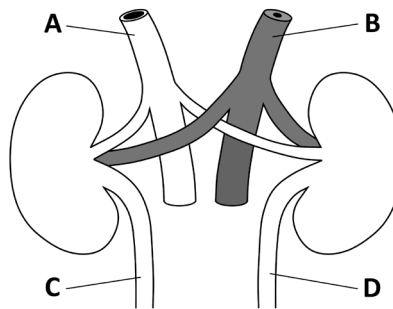


1. The urinary system, particularly the kidneys, plays a crucial role in maintaining homeostasis within the body. Answer the following questions. Circle the letter of the correct answer for each.

a) Where is urea formed in the body?

- | | | | |
|----------|----------|----------|----------|
| A | B | C | D |
| Kidneys | Liver | Stomach | Pancreas |
- (1 mark)**

b) In a healthy person, which of the structures below contain the least urea?



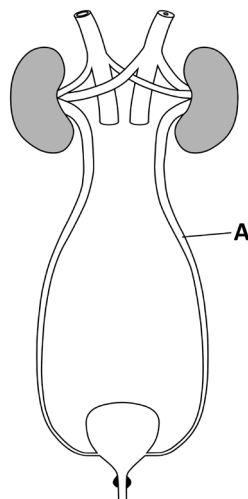
(1 mark)

c) Which of the following does **not** occur in the kidneys?

- A** The removal of excess salts from the blood.
- B** The removal of alcohol from the blood.
- C** The removal of excess water from the blood
- D** The removal of urea from the blood

(1 mark)

d) The figure below shows the urinary system of a human.



What is the part labelled A?

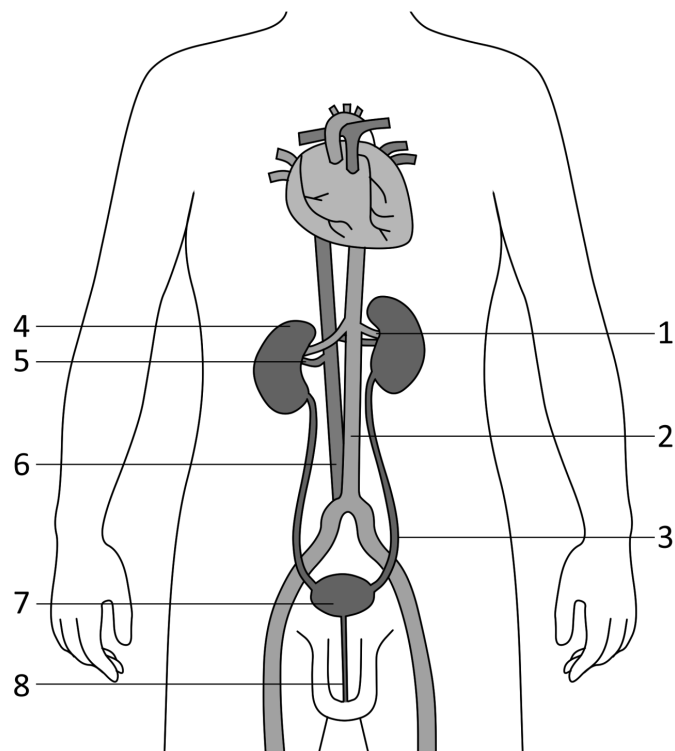
- | | | | |
|----------|----------|----------|--------------|
| A | B | C | D |
| Kidney | Urethra | Ureter | Renal artery |

(1 mark)

(Total for Question 1 is 5 marks)

2. The figure below shows the urinary system of a human male.

a) Identify the structures labelled 1 to 8.



- | | |
|---------|---------|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

(4 marks)

A patient is diagnosed with a condition affecting the glomeruli in their kidneys.
Analysis of their urine reveals the presence of significant amounts of protein and glucose.
Additionally, the patient exhibits persistent high blood pressure and increased levels of urea in their blood.

b) Explain why the presence of protein in the urine of this patient indicates a problem with the glomeruli.

.....

.....

.....

.....

.....

.....

(3 marks)

- c) Suggest **two** possible reasons why glucose might be present in the urine of this patient, even if they do not have diabetes.

.....

.....

.....

.....

.....

.....

(2 marks)

- d) Describe a test to show that a sample of urine contains glucose.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

- e) Explain how glucose and amino acids are reabsorbed from the proximal convoluted tubule (PCT) to the capillaries surrounding the kidney nephrons.

.....

.....

.....

.....

.....

.....

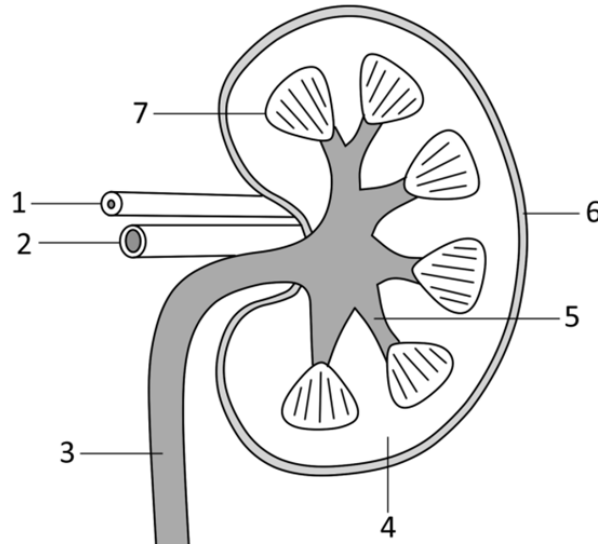
.....

.....

(3 marks)

(Total for Question 2 is 15 marks)

3. The figure below shows a section through a kidney.



a) Identify the structures labelled 1 to 7.

- | | |
|---------|---------|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | |

(4 marks)

Kidney failure is a serious condition where the kidneys lose their ability to filter waste products effectively from the blood.

b) Identify the substance that kidneys remove from the blood and state where this substance is produced.

.....

.....

.....

.....

(2 marks)

c) A patient with suspected kidney failure provides a urine sample. A test is done on the sample to determine if proteins are present in the urine.

Describe a test that could be used to identify proteins in the urine.

.....

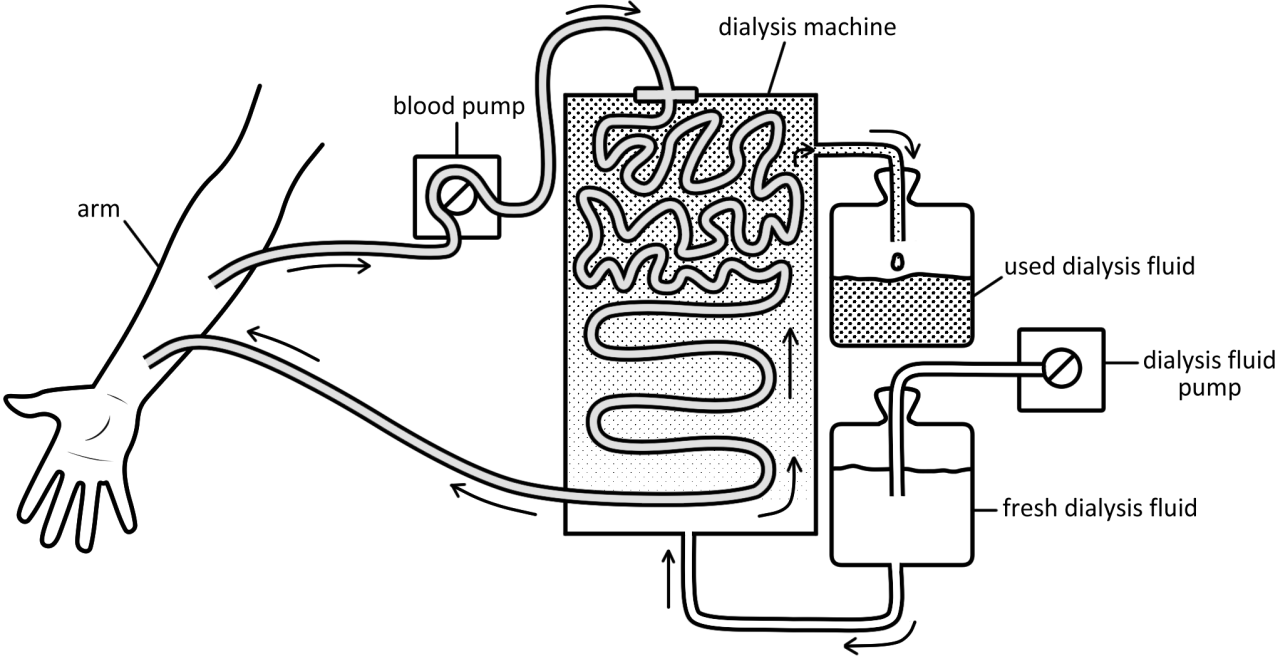
.....

.....

.....

(2 marks)

When kidney failure reaches a severe stage, patients often require kidney dialysis.



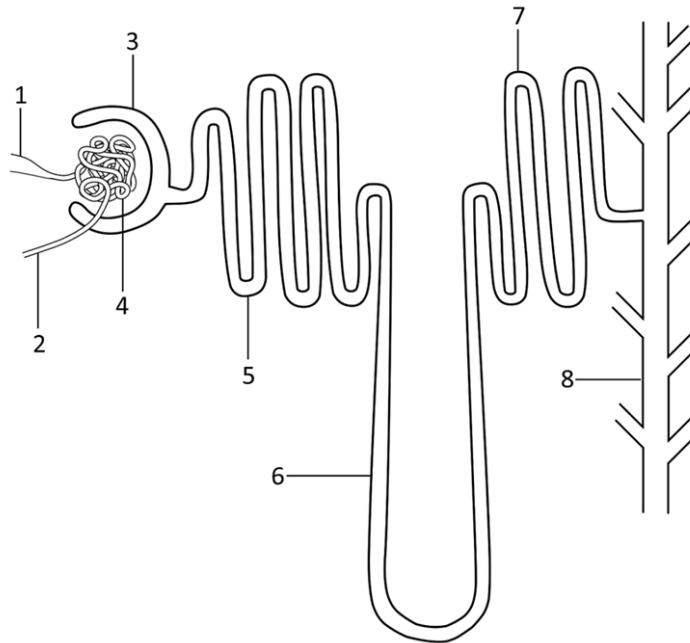
d) Discuss the use of different treatments for kidney failure.

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

(6 marks)

(Total for Question 3 is 14 marks)

4. The figure below shows the structure of a kidney nephron.



a) Identify the structures labelled 1 to 8.

- | | |
|---------|---------|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

(4 marks)

Blood enters a structure in the kidney where small molecules are forced out of the blood and into a surrounding capsule. This fluid then travels along a tube.

b) Name the blood vessel that carries blood into this structure.

.....

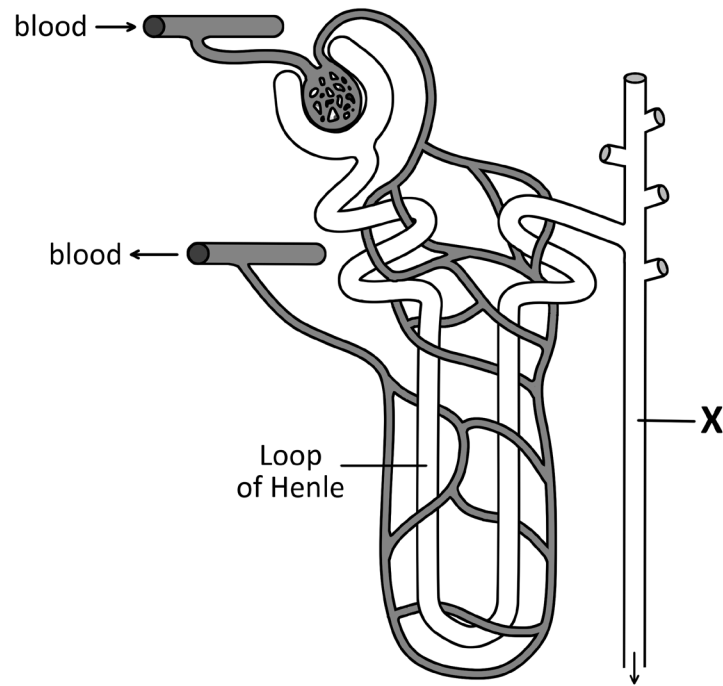
(1 mark)

c) Describe **two** features of this structure that allow the efficient movement of small molecules from the blood into the surrounding capsule.

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

(2 marks)

5. The figure below shows the structure of a kidney nephron of a human.



a) Identify the process that takes place in the glomerulus of the nephron.

.....
(1 mark)

b) Describe the process of how substances move from the blood in the glomerulus into Bowman's capsule. In your answer, you should refer to the relevant structures and the forces involved.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
(4 marks)

c) Water is reabsorbed by the loop of Henle. How is water reabsorbed?

.....
(1 mark)

d) Describe the process by which water is reabsorbed in the loop of Henle.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

e) Identify structure X of the nephron labelled above.

.....

(1 mark)

f) Explain how this structure in the kidney plays a crucial role in osmoregulation, making reference to the hormone(s) involved in this process.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

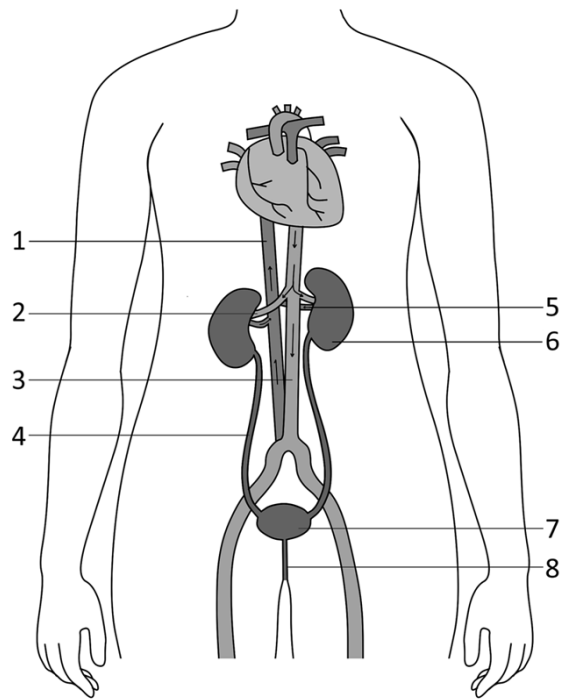
.....

.....

(4 marks)

(Total for Question 5 is 14 marks)

6. The figure below shows the urinary system of a human female.



a) Identify the structures labelled 1 to 8.

- | | |
|---------|---------|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

(4 marks)

b) Explain how glucose and amino acids are reabsorbed from the proximal convoluted tubule (PCT) to the capillaries surrounding the kidney nephrons.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

(Total for Question 6 is 8 marks)