

Past-paper walk-through

Excretion in humans ■ 13.1

eXercise

Questions in this set

- 0610/21 N25 Q20 ■ 1 mark
- 0610/22 N25 Q14 ■ 1 mark
- 0610/23 N25 Q19 ■ 1 mark
- 0610/21 J25 Q20 ■ 1 mark
- 0610/22 J25 Q23 ■ 1 mark
- 0610/23 J25 Q21 ■ 1 mark
- 0610/23 J25 Q22 ■ 1 mark
- 0610/41 J25 Q4 ■ 14 marks
- 0610/22 M25 Q20 ■ 1 mark

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 20

0610/21 N25 ■ Q20 ■ 1 mark

20 Which statements are correct for a healthy person?

- 1 Blood leaving a glomerulus has the same concentration of glucose as blood entering a glomerulus.
- 2 There is no glucose in the fluid leaving a nephron.
- 3 A nephron reabsorbs all of the water and some of the ions filtered out of the blood by a glomerulus.

A 1 and 3

B 1 only

C 2 and 3

D 2 only

Solution 20

Answer: **D**

Why

- Glucose is small, so it *is* filtered out at the glomerulus – so the fluid there does contain glucose.
- It is then completely reabsorbed further along the tubule.
- So the blood leaving still has the same glucose concentration as the blood entering.

Question 14

0610/22 N25 ■ Q14 ■ 1 mark

- 14** Which row names the blood vessel containing the highest blood urea concentration and the blood vessel containing the lowest blood urea concentration?

	highest blood urea concentration	lowest blood urea concentration
A	hepatic artery	hepatic vein
B	hepatic vein	renal vein
C	hepatic portal vein	renal artery
D	renal vein	hepatic portal vein

Solution 14

Answer: **B**

Why

- Urea is made in the liver, so the blood leaving the liver carries the most.
- The kidney removes it, so the blood leaving the kidney carries the least.
- So the highest is the hepatic vein and the lowest the renal vein.

Question 19

0610/23 N25 ■ Q19 ■ 1 mark

19 What shows the pathway of urea from where it is produced to where it is excreted?

- A** kidney → renal artery → heart → lungs → heart → renal vein → bladder
- B** kidney → renal vein → heart → lungs → heart → renal artery → bladder
- C** liver → hepatic artery → heart → lungs → heart → renal artery → kidney
- D** liver → hepatic vein → heart → lungs → heart → renal artery → kidney

Solution 19

Answer: **D**

Why

- Urea is made in the liver and enters the blood there.
- It travels in the blood to the kidney, arriving through the renal artery.
- The kidney filters it out into the urine, which passes to the bladder – so the renal artery comes before the kidney.

Question 20

0610/21 J25 ■ Q20 ■ 1 mark

20 What is a role of the glomerulus?

- A** assembling amino acids into proteins
- B** filtration of water, glucose, urea and ions from the blood
- C** reabsorption of glucose, ions and water back into the blood
- D** removal of the nitrogen-containing part of amino acids to form urea

Solution 20

Answer: **B**

Why

- The glomerulus is a knot of capillaries inside the renal capsule.
- High pressure there forces small molecules out of the blood.
- So it carries out filtration; reabsorption happens later, along the tubule.

Question 23

0610/22 J25 ■ Q23 ■ 1 mark

23 Which organ produces urea?

A bladder

B kidney

C liver

D pancreas

Solution 23

Answer: **C**

Why

- Excess amino acids are deaminated, and the amino group is converted into urea.
- That happens in the liver.
- The kidney *removes* urea from the blood, and the bladder only stores the urine.

Question 21

0610/23 J25 ■ Q21 ■ 1 mark

21 What is filtered out of the blood in the glomerulus and into the nephron?

	glucose	urea
A	yes	yes
B	yes	no
C	no	yes
D	no	no

Solution 21

Answer: **A**

Why

- The glomerulus filters by size, so small molecules pass through and large ones do not.
- Both glucose and urea are small enough to be filtered out.
- Glucose is then reabsorbed further along the tubule, but it *is* filtered first.

Question 22

0610/23 J25 ■ Q22 ■ 1 mark

22 What can be broken down to form urea?

- A** amino acids
- B** fatty acids
- C** sugars

D vitamins

Solution 22

Answer: **A**

Why

- Urea is made from the nitrogen-containing part of a molecule.
- Amino acids contain an amino group, which is removed by deamination.
- That amino group becomes urea; fatty acids, sugars and vitamins have no amino group.

Question 4

0610/41 J25 ■ Q4 ■ 14 marks

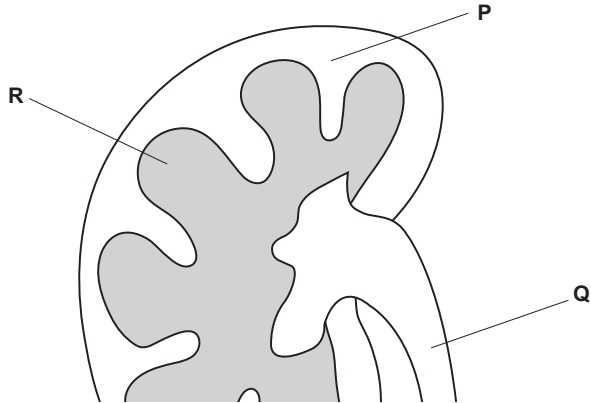
- 4** The kidney is an organ in the excretory system.
- (a)** Describe what is meant by the term excretion.

Question 4

(b) State the name of the substance excreted by the lungs.

Question 4

(c) Fig. 4.1 shows a simplified diagram of a cross-section of a kidney.



Question 4

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Question 4

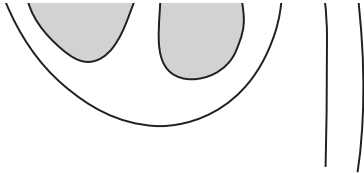


Fig. 4.1

State the names of the parts labelled **P**, **Q** and **R** in Fig. 4.1.

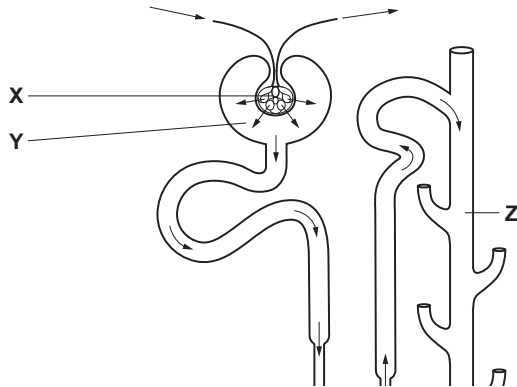
Question 4

Question 4

Question 4

[3]

(d) Fig. 4.2 shows the structure of a kidney nephron.



Question 4

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Question 4



Fig. 4.2

Describe **and** explain the difference in the composition of the fluids in structures **X**, **Y** and **Z** in Fig. 4.2.

Question 4

(e) The liver is also involved in excretion.

Describe **two** ways that amino acids are processed in the liver.

Question 4

Question 4

[2]

[Total: 14]

Solution 4

(a)

Mark scheme

- removal of waste products of metabolism ;
- and substances in excess (of requirements) ;
- 2

Solution 4

(b)

Mark scheme

- carbon dioxide ;
- 1 A water (vapour)

Solution 4

(c) Mark scheme

- P - cortex ;
- Q - ureter ;
- R - medulla ;
- 3
- 0610/41
- May/June 2025
- Guidance

Solution 4

(d) Mark scheme

- any six from:
- 1
- X contains blood ;
- 2
- ref. to filtration (between X and Y) ;
- 3
- proteins / blood cells / large molecules, too big to, be filtered / enter Y ;
- 4

Solution 4

- Y contains, glucose, water, urea and ions ;
- 5
- Z contains no glucose ;
- 6
- (all) glucose has been reabsorbed (into the blood) ;
- 7
- Z contains excess, water / ions ;
- 8
- (some) water / ions, reabsorbed (into the blood) ;
- 9

Solution 4

- Z contains high(er), concentration / AW, of urea ;
- 10 Z contains urine ;
- 6

Solution 4

(e)

Mark scheme

- deamination / removal of nitrogen-containing part (to form urea) ;
- assimilation / conversion to or synthesis of proteins ;
- AVP ;
- 2
- Guidance

Question 20

0610/22 M25 ■ Q20 ■ 1 mark

20 In a healthy human, in which blood vessel would you find the **lowest** concentration of urea?

- A** hepatic artery
- B** hepatic vein
- C** renal artery
- D** renal vein

Solution 20

Answer: **D**

Why

- Urea is made in the liver and removed by the kidneys.
- So the blood leaving the kidney has had its urea filtered out.
- The renal *vein* therefore carries the lowest concentration of urea.