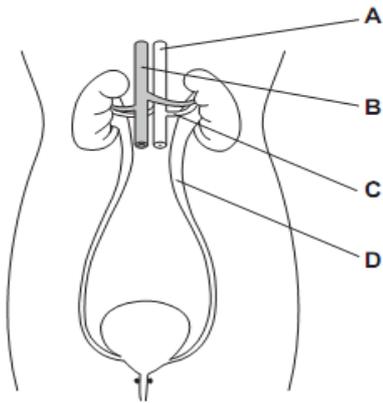1. The diagram shows the human excretory system and its main associated blood vessels.
Which labelled structure contains urine?

2 The table shows the amount of water and salt lost from the kidneys and skin on a hot day and on a cold day. Food and drink intake are the same on both days.

	water lost from kidneys/dm^3	water lost from skin/dm^3	salt lost from kidney/g	salt lost from skin/g
cold day	1.8	0.0	20.2	0.0
hot day	0.4	2.3	14.4	5.8

What do these results show?
A Less water is lost from the kidneys on a cold day than on a hot day.
B More salt is lost from the kidneys on a hot day than on a cold day.
C The total amount of salt lost each day is the same.
D Water is not lost from the kidneys on hot days.

3 The diagram shows a kidney and its blood vessels.
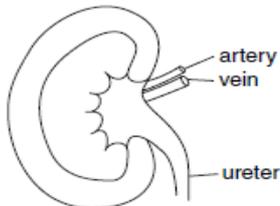
In a healthy person, which structures transport glucose?
A artery only B artery and ureter C artery and vein D ureter and vein

4 Blood passes through the kidney and some substances leave the blood as filtered liquid.
From this liquid certain substances are reabsorbed back into the blood.
The table shows the percentage of four substances in the blood plasma, the filtered liquid and urine.

| substance	percentage of substance		
	in the blood plasma	in the filtered liquid	in the urine
glucose	0.10	0.10	0.00
protein	9.00	0.00	0.00
urea	0.03	0.03	2.00
water	90.0	99.0	97.0

Which substances are reabsorbed from the filtered liquid?
A glucose and water B protein and glucose C urea and protein D water and urea

5 Which materials are excreted by kidneys and lungs?

	kidneys	lungs
A	carbon dioxide	carbon dioxide
B	carbon dioxide	urea
C	urea	carbon dioxide
D	urea	urea

6 (a) Fig. 11.1 shows the urinary system and its blood supply.

.... X

direction of
blood flow

.... Y

.... Z
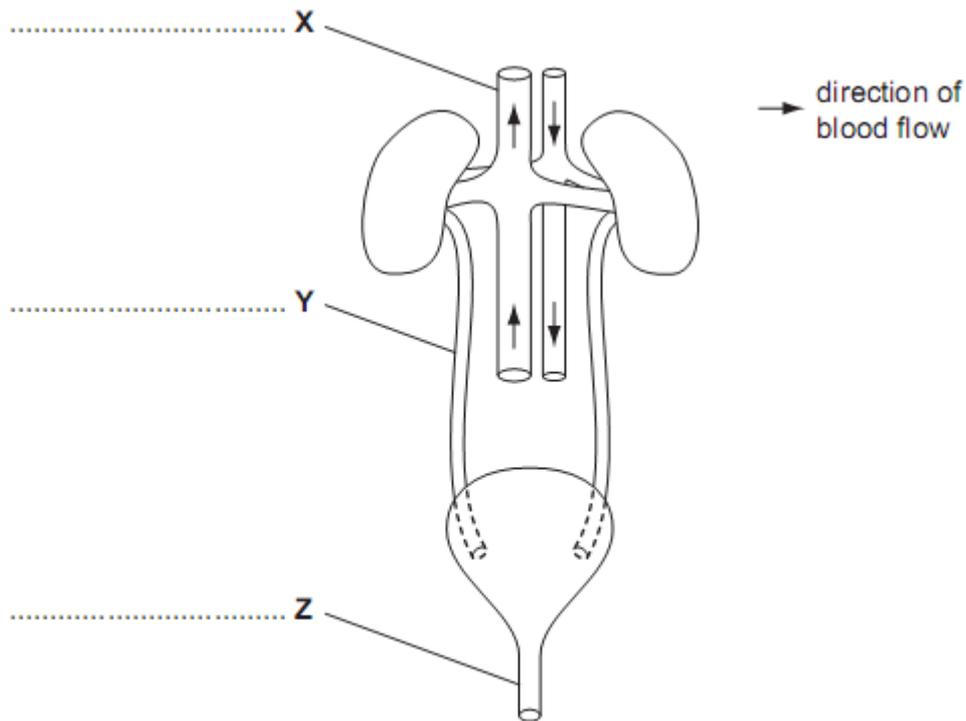
Fig. 11.1

On Fig. 11.1 label structures X, Y and Z. [3]
 (b) Table 11.1 shows the relative quantities of several substances in the blood in the renal artery and renal vein.

Table 11.1

substance	relative quantities in blood in renal artery (arbitrary units)	relative quantities in blood in renal vein (arbitrary units)
glucose	10.0	9.7
oxygen	100.0	35.0
sodium salts	32.0	29.0
urea	3.0	1.5
water	180.0	178.0

Explain what is happening in the kidney to bring about three of the differences between the blood in the renal artery and renal vein, shown in the table.

………

……………………….. [3]

 [Total: 6]

7 (a) Why do most waste products of metabolism have to be removed from the body?[1]

(b) Fig.2.1 shows the human excretory system.
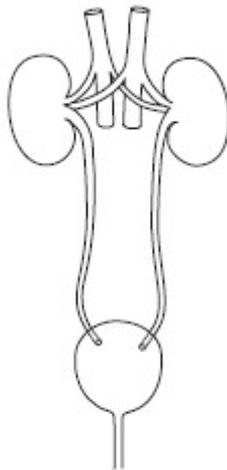
Fig. 2.1

Name the parts that fit each of the following descriptions.

(i) The tube that carries urine from the kidneys.[1]

(ii) The organ that stores urine.[1]

(iii) The blood vessel that carries blood away from the kidney.[1]

(c) Outline how the kidneys remove only waste materials from the blood.[3]

(d) Excess amino acids cannot be stored in the body and have to be broken down.

(i) Where are excess amino acids broken down?[1]

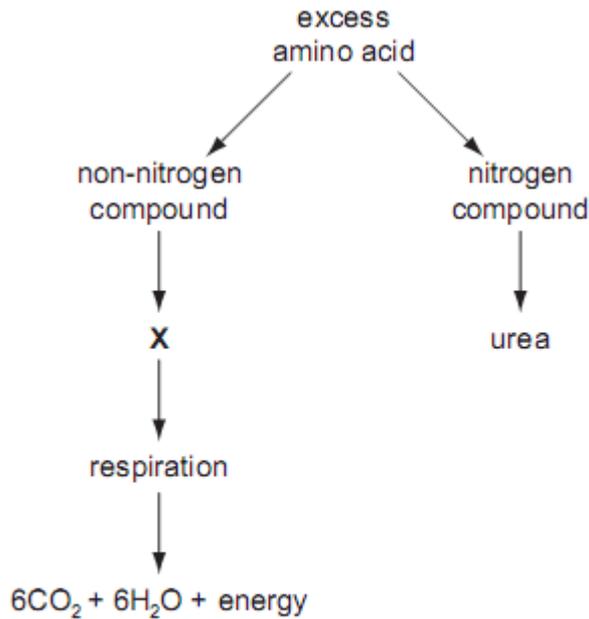(ii) Which waste chemical is formed from the breakdown of excess amino acids?[1]

[Total: 9]

8 To stay healthy we need a balanced diet.

  (a) Define the term balanced diet.

………
…………………….. [2]

Protein is one nutrient present in a balanced diet. The body cannot store protein, so any excess amino acids are broken down in the process of deamination, as shown in Fig. 5.1.

excess
amino acid

non-nitrogen
compound

nitrogen
compound

X

urea

respiration

$6CO_2 + 6H_2O$ + energy

Fig. 5.1

(b) (i) Name the organ where deamination takes place.

………
…………………….. [1]

(ii) Compound X is used as an energy source in respiration. Suggest the name of compound X.

………
…………………….. [1]

(iii) State the type of respiration shown in Fig. 5.1. Explain your answer.

type of respiration

………
…………………….

explanation

………
…………………… [2]

(c) The urea produced is transported to the kidney, where it is excreted.
   Describe how urea is transported in the blood to the kidney.

……
…………………….. [2]

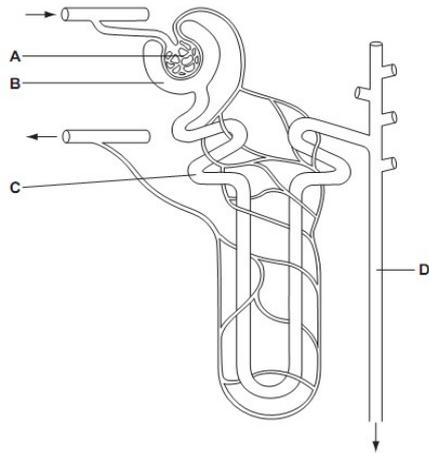Fig. 5.2 shows a kidney tubule (nephron) and its associated blood vessels.

Fig. 5.2

(d) Complete the table by naming the parts labelled A to D and stating one function for each.

	name of part	function
A	....	....
B	....	....
C	....	....
D	....	....

[8]

(e) The volume of blood filtered by the kidneys is 1.18 dm3 min-1.
(i) Calculate the total volume of blood filtered in 24 hours.
Show your working.
volume = ………………………………………… [2]
(ii) If the total volume of urine produced in 24 hours is 1.7 dm3, calculate the percentage volume of the filtered blood excreted as urine in 24 hours.
Show your working.
% volume = ………………………………………….. [2]
[Total: 20]