

Solutions

Each answer shows the steps, then the **result**.

2.1

- the **ureter** carries urine from the kidney to the bladder
- the **urethra** carries urine from the bladder to outside the body

2.2

- the **cortex** and the **medulla**
- the **cortex** is on the outside

2.3

- urea is made in the **liver**
- from **excess amino acids**

2.4

- deamination is the **removal of the nitrogen-containing part** of an amino acid
- which forms **urea**; the rest of the molecule can be respired or stored

2.5

- urea is **toxic**
- so if it built up in the blood it would poison and damage the body's cells; it must therefore be removed continuously

2.6

- the liver takes the **amino acids** absorbed from digested protein
- and **converts them into the body's own proteins** – this is assimilation

3.1 C

- carbon dioxide, the waste product of respiration, is excreted through the lungs
- urea, excess water and excess ions (**A, B, D**) are all excreted by the **kidneys**

3.2

(a)

- **kidney** → **ureter** → **bladder**
- → **urethra** → out of the body
- △ no mark if ureter and urethra are swapped

(b)

- the **cortex**
- and the **medulla**
- the **cortex** is nearer the outside

(c)

- blood enters by the **renal artery** and leaves by the **renal vein**
- the **renal vein** contains less urea, because urea has been removed from the blood inside the kidney

3.3

(a)

- the excess amino acids cannot be stored, so they are broken down in the **liver**
- by **deamination** – the nitrogen-containing part of each amino acid is removed
- forming **urea**, which is carried in the blood to the kidneys

(b)

- urea is **toxic**
- so allowing it to accumulate in the blood would damage or poison the body's cells

(c)

- at the **glomerulus**, blood is at high pressure and is **filtered**
- so water, glucose, urea and ions pass into the nephron, while blood cells and proteins are too large and remain in the blood
- along the rest of the nephron, **selective reabsorption** returns **all** the glucose, **some** of the ions and **most** of the water to the blood
- what remains – urea, excess water and excess ions – forms the **urine**

(d)

- **glucose**