Solutions

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

2.1

(a)

- the nervous system

(b)

- the endocrine system

2.2

- any two of: glucose; water; (named) ions

2.3

- in the liver
- deamination: the amino group is removed from excess amino acids, forming ammonia, which is converted to urea

3.1 C

- Plasma proteins are too large to be filtered; the others pass into the filtrate

3.2 B

- ADH makes the collecting ducts more permeable to water (more aquaporins)

3.3

(a)

- microvilli give a large surface area for reabsorption; many mitochondria release ATP for active transport; carrier proteins reabsorb glucose/ions

(b)

- the hypothalamus detects the low water potential and the pituitary releases ADH; the collecting ducts gain aquaporins and become more permeable; more water is reabsorbed into the blood, raising its water potential

3.4

(a)

- cyclic AMP (cAMP)

(b)

- each enzyme activates many molecules of the next enzyme, so a few hormone molecules trigger a large response

3.5

(a)

- glucose oxidase and peroxidase

(b)

- glucose oxidase converts glucose and oxygen into gluconic acid and hydrogen peroxide
- peroxidase makes the hydrogen peroxide oxidise a colourless chromogen to a coloured product; the colour is compared with a chart, a darker colour meaning more glucose

(c)

- for example: gives a precise digital reading of the current concentration; can be used repeatedly

3.6

(a)

- P cortex, Q medulla, R renal pelvis, S ureter (all four B2; two or three B1)

(b)

- glomeruli: **P** (cortex); loops of Henle: **Q** (medulla)