Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

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

2.1

A **proximal tubule**

B **glomerulus**

C **thin limb** of the loop of Henle

2.2

1 zona glomerulosa: **aldosterone**

2 zona fasciculata: **cortisol**

3 zona reticularis: **androgens**; 4 medulla: **adrenaline**

2.3

A is more active

its cells are tall (busy making hormone) and the colloid is being used up

2.4

stratum basale, stratum spinosum

stratum granulosum, stratum corneum

3.1

(a) arm 9% + front of trunk 18% = **27**%

(b) $4 \times 70 \times 27 = 7560$ mL; first 8 h: **3780** mL

(c) the hair follicles and glands, with their stem cells, are destroyed; new skin can only grow in from the edges, so grafts are needed

(d) the nerve endings in the dermis are destroyed

3.2

(a) the **podocytes** and their slit diaphragms

(b) albumin is lost in the urine, so plasma protein falls; lower oncotic pressure lets fluid leave capillaries into the tissues

(c) the brush border gives a huge surface for reabsorption; mitochondria make the ATP for the Na^+/K^+ pumps that drive it

3.3

(a) **zona fasciculata**

(b) aldosterone makes the kidney keep Na^+ and water, raising blood pressure, and lose K^+ in exchange

exercises.lol exercises.com.cn

(c) cortisol: low blood sugar and weakness; aldosterone: Na^+ loss, low blood pressure and high K^+

(d) **chromaffin cells** (phaeochromocytoma); bursts of adrenaline raise heart rate and blood pressure and cause sweating

(e) its cells come from neural crest, like sympathetic neurons, and are driven by preganglionic sympathetic nerves