Higher Tier — Separate Science

Full Higher Separate content. ★ = Higher Tier. ◆ = Separate Science only.

★ HIGHER TIER

Q1. ★ Describe ultrafiltration and selective reabsorption in the kidney.

[4 marks]

★ HIGHER TIER

Q2. ★ Explain the role of ADH in regulating urine concentration.

[3 marks]

Q3. Explain how dialysis maintains the composition of blood in patients with kidney failure.

[3 marks]

Total: 10 marks

Q1 (4 marks) [★ HT]

★ Describe ultrafiltration and selective reabsorption in the kidney.

• Ultrafiltration: blood filtered at high pressure in glomerulus → water, glucose, urea, ions enter Bowman's capsule [1]

• Large molecules (proteins, blood cells) remain in blood [1]

• Selective reabsorption: ALL glucose reabsorbed by active transport; most water reabsorbed [1]

• Remaining urea + excess water → urine [1]

Q2 (3 marks) [★ HT]

★ Explain the role of ADH in regulating urine concentration.

• When blood water content is LOW → pituitary releases more ADH [1]

• ADH makes collecting duct more permeable to water [1]

• More water reabsorbed → small volume of concentrated urine → blood water content rises [1]

Q3 (3 marks)

Explain how dialysis maintains the composition of blood in patients with kidney failure.

• Blood pumped through dialysis machine across partially permeable membrane [1]

• Dialysis fluid contains correct concentrations of glucose and useful ions — so they are not lost [1]

• Excess urea, water and ions diffuse from blood to dialysis fluid → blood composition corrected [1]