### 11.3 The kidney – summary of mark schemes

#### 11.3.1 Define excretion.

**Mark Scheme**

A. removal of waste from the body;  
B. products of metabolism / toxic waste products;

#### 11.3.2 Draw and label a diagram of the kidney.

**Mark Scheme**

A. cortex shown at the edge of kidney;  
B. medulla shown inside the cortex (with pyramids);  
C. pelvis shown on the concave side of the kidney;  
D. ureter shown connecting with the pelvis / on concave side / hilum;  
E. renal artery shown connected to the concave / pelvis side / away from cortex;  
F. renal vein shown connected to the concave / pelvis side / away from cortex;

#### 11.3.3 Annotate a diagram of a glomerulus and associated nephron to show the function of each part.

**Mark Scheme**

A. glomerulus;  
B. fenestrated capillaries; (shown as an enlarged diagram)  
C. afferent arteriole;  
D. efferent arteriole; (with smaller diameter than afferent)  
E. Bowman’s capsule; (shown as a continuation of proximal convoluted tubule)  
F. ultrafiltration / high pressure in the glomerulus;  
G. glomerular filtrate produced in Bowman’s capsule;  
H. flows to proximal convoluted tubule;  
I. proximal convoluted tubule; (shown with convolutions)  
J. 80% of water reabsorbed;  
K. filtrate enters descending limb / loop of Henle;  
L. ascending and descending both labeled;  
M. descending limb permeable to water / water drawn out by osmosis;  
N. ascending limb pumps sodium into tissues;  
O. ascending limb impermeable to water;  
P. decrease in filtrate concentration (in ascending portion);  
Q. distal convoluted tubule; (shown with convolutions)  
R. concentration in distal convoluted tubule equals concentration in proximal convoluted tubule;  
S. collecting duct; (shown with branches)  
T. high solute concentration ADH released / ADH controls water balance;  
U. ADH makes collecting duct water permeable to water;  
V. so water can move to tissues / so the urine is more concentrated;

#### 11.3.4 Explain the process of ultrafiltration, including blood pressure, fenestrated blood capillaries and basement membrane.

**Mark Scheme**

G. high pressure in afferent arterioles;  
H. difference in diameter of efferent and afferent arteriole;  
I. leads to blood in glomerulus at high pressure;  
J. capillary wall is fenestrated / has pores / holes; leads to ultrafiltration in the glomerulus / through fenestrated capillaries in the glomerulus;  
K. basement membrane has pores;  
L. pores in basement membrane prevent large (protein) molecules from leaving blood plasma / only allows passage of small molecules;  
M. drains through the Bowman's capsule to the proximal convoluted tubule;  
N. passive process;
11.3.6 Explain the reabsorption of glucose, water and salts in the proximal convoluted tubule, including the roles of microvilli, osmosis and active transport.

**Mark Scheme**

A. important that some products of digestion not lost;
B. products in the blood stream;
C. ultrafiltration in the glomerulus;
D. fenestrated capillaries / podocytes;
E. basement membrane acts as the filter;
F. proteins too large to pass through;
G. importance of proximal convoluted tubule;
H. reabsorption of salts / glucose / ions / other named substance;
I. microvilli;
J. details of active transport;
K. osmosis is the reabsorption of water;
L. detail of osmoregulation;