# 11.3 The kidney – *summary of mark schemes*

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| 11.3.1 | Define *excretion*.<br><br>Mark Scheme<br><br>A. removal of waste from the body;<br>B. products of metabolism / toxic waste products; |
| 11.3.2 | Draw and label a diagram of the kidney.<br><br>Mark Scheme<br><br>A. cortex shown at the edge of kidney;<br>B. medulla shown inside the cortex (with pyramids);<br>C. pelvis shown on the concave side of the kidney;<br>D. ureter shown connecting with the pelvis / on concave side / hilum;<br>E. renal artery shown connected to the concave / pelvis side / away from cortex;<br>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.<br><br>Mark Scheme<br><br>A. glomerulus;<br>B. fenestrated capillaries; (shown as an enlarged diagram)<br>C. afferent arteriole;<br>D. efferent arteriole; (with smaller diameter than afferent)<br>E. Bowman's capsule; (shown as a continuation of proximal convoluted tubule)]<br>F. ultrafiltration / high pressure in the glomerulus;<br>G. glomerular filtrate produced in Bowman's capsule;<br><br>H. flows to proximal convoluted tubule;<br>I. proximal convoluted tubule; (shown with convolutions)<br>J. 80% of water reabsorbed;<br><br>K. filtrate enters descending limb / loop of Henle;<br>L. ascending and descending both labeled;<br>M. descending limb permeable to water / water drawn out by osmosis;<br>N. ascending limb pumps sodium into tissues;<br>O. ascending limb impermeable to water;<br>P. decrease in filtrate concentration (in ascending portion);<br><br>Q. distal convoluted tubule; (shown with convolutions)<br>R. concentration in distal convoluted tubule equals concentration in proximal convoluted tubule;<br><br>S. collecting duct; (shown with branches)<br>T. high solute concentration ADH released / ADH controls water balance;<br>U. ADH makes collecting duct water permeable to water;<br>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.<br><br>Mark Scheme<br><br>G. high pressure in afferent arterioles;<br>H. difference in diameter of efferent and afferent arteriole;<br>I. leads to blood in glomerulus at high pressure;<br>J. capillary wall is fenestrated / has pores / holes;leads to ultrafiltration in the glomerulus / through fenestrated capillaries in the glomerulus;<br>K. basement membrane has pores;<br>L. pores in basement membrane prevent large (protein) molecules from leaving blood plasma / only allows passage of small molecules;<br>M. drains through the Bowman's capsule to the proximal convoluted tubule;<br>N. passive process; |

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