

The Kidneys

Answer	Marks
 a) i) -Renal artery supplies blood to the renal capsule Splits up into arterioles that each supply blood to a nephron Arterioles split into knots of capillaries called a glomerulus 	3 marks
ii) - Filtration, reabsorption - excretion	2 marks
 iii) - Blood enters through the renal artery High blood pressure forces liquid through the capillary walls Large molecules stay in the capillary blood Tissue fluid is collected in the Bowman's capsule 	4 marks
iv) Afferent arteriole is wider than the efferent arterioles	1 mark
v) It filters	1 mark
2. a) i) To ensure that useful materials such as glucose and amino acids are returned to the blood/ not excreted	1 mark

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b) i) – Longest part of the nephron/ convoluted - Large surface area for maximum reabsorption .	2 marks
ii) Active transport of glucose/ amino acids.	1 mark
iii) Urea can pass directly through the membrane by diffusion	1 mark
c) i) Increases water reabsorption/ reduces water loss	1 mark
 ii) Water leaves the descending limb of the Loop of Henle by osmosis Na⁺ and Cl⁻ ions diffuse into the loop Ion concentration gets higher towards the base of the loop Na⁺ and Cl⁻ ions are then actively pumped out of the ascending limb Lowers water potential in the medulla so more water leaves the descending limb and collecting duct by osmosis ascending limb is impermeable to water. d) Antidiuretic hormone (ADH) Alters the membrane permeability of the collecting duct 	6 marks 2 marks

 ii) - water potential of blood rises Detected by osmoreceptors in the hypothalamus Stimulates the pituitary to release less ADH Collecting ducts become less permeable to water, so less water is reabsorbed by osmosis More water is lost in urine 	5 marks
 a) i) B Kangaroo rat Longer loop of Henle means the loop goes deeper into the medulla Medulla would then have a lower water potential so water can be reabsorbed into the blood Urine is more concentrated and less water is lost in a hot environment 	4 marks