

Marks

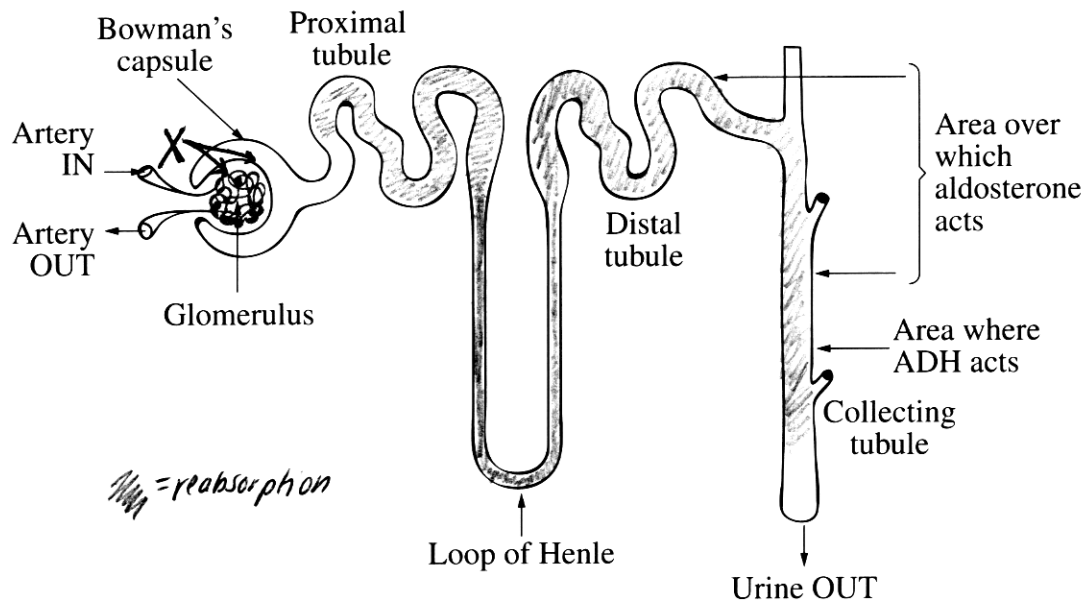
Question 23 (6 marks)

The diagram represents a nephron which is the functional unit of the kidney.

Nephrons make urine by:

- filtering small molecules and ions from the blood;
- reabsorbing the needed amounts of useful materials.

Surplus or waste molecules and ions flow out as urine.



- (a) Identify the area where filtration occurs, by marking it with an X on the diagram. **1**
- (b) Identify the area where reabsorption occurs, by shading it on the diagram. **1**
- (c) Discuss the importance of hormone replacement therapy for people who cannot secrete aldosterone. **4**

Hormone replacement therapy is of crucial importance for people who cannot secrete aldosterone (sufferers of Addison's disease). This is because aldosterone is the hormone that stimulates the kidney to reabsorb salt from the glomerular filtrate. Absence of this hormone implies that individuals would be unable to regulate their internal salt concentration (i.e., although salt would be filtered from the blood in the glomerulus, they would not be subsequently reabsorbed), and would thus progressively lose salt from their bloodstream (and subsequently experience a drop in blood pressure and volume). ~~That~~ Hormone replacement therapy, through providing sufferers of Addison's disease with regular supplies of aldosterone, enables these individuals to maintain proper internal fluid concentrations (which, in turn, enables them to maintain homeostasis). Thus, although rRT can be inconvenient and costly, it is still of crucial importance to people who cannot