

**CBSE Class 11 Biology**  
**Important Questions**  
**Chapter 19**  
**Excretory Products and their Elimination**

**1 Marks Questions**

**1. In which part of nephron filtration takes place?**

**Ans.** Glomerulus.

**2. What difference is observed in the ascending and descending limb of Henle's loop with reference to permeability of water?**

**Ans.** Ascending limb of Henle's loop is impermeable to water. Descending limb of Henle's loop is permeable to water.

**3. What is the PH of urine.**

**Ans.** It is slightly acidic, PH – 6.0

**4. Name the three kinds of nitrogen excretion.**

**Ans. (a) Ammonotelism (b) Ureotelism (c) Uricotelism**

**5. What are podocytes?**

**Ans.** Epithelial cells of Bowman's capsule are called podocytes.

**6. Besides water, name any two constituents of human sweat.**

**Ans.** Sodium chloride and urea.

**7. What happens in glomerulonephritis?**

**Ans.** Inflammation of glomeruli of kidney.

**8.Name the excretory organ of cockroach.**

**Ans.** Malpighian tubules.

**9.Name the hormone which controls the concentration of sodium in the body.**

**Ans.** Aldosterone is a hormone which controls concentration of sodium in the body.

**10.Which gland secrete sebum?**

**Ans.** The sebaceous glands are microscopic exocrine glands in the skin that secrete an oily or waxy matter, called **sebum**,

**11.ble to water. Name it.**

**Ans.** Ascending limb

**12.Besides water, name any two constituents of human sweat.**

**Ans.** Sodium chloride, lactic acid, glucose (any two).

**13.Explain the function of vasa rectae.**

**Ans.** It helps to retain reabsorbed ions and urea in the interstitial fluid of the medulla, to maintain its high osmotic pressure.

**14.Name two types of nephrons found in human kidney.**

**Ans.** (i) Juxta medullary nephron (ii) Cortical nephron.

**15.Define GFR (Glomerular Filtration Rate)**

**Ans.** The amount of filtrate formed by the kidney per minute.

**16.The mechanism of is also known as counter current mechanism justify the statement.**

**Ans.** (in the ascending limb) the out flow runs parallel to and in the opposite direction of the inflow in the descending limb.

**17.What Is maturation?**

**Ans.** the act of passing out urine from urinary bladder.

**18.Write the function of enzyme ‘renin’ produced by kidney.**

**Ans.** Renin is used to convert angiotensinogen to angiotensin.

**19.Name the excretory product of (i) reptiles (ii) Prawns.**

**Ans.(i)** Uric acid **(ii)** Ammonia.

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**2 Marks Questions**

**1. Differentiate between Rennin and Renin?**

**Ans.**

	<b>Rennin</b>	<b>Renin</b>
<b>1.</b>	Secreted from the peptic cell or gastric glands in stomach.	Secreted from the juxtaglomerular cells of afferent renal artery in the renal cortex of kidney.
<b>2.</b>	The rennin is proteolysis enzyme.	Renin is a hormone but it acts as enzyme also.
<b>3.</b>	Helpful in the digestion of milk of protein.	Converts angiotensinogen into angiotensin – II
<b>4.</b>	Released in inactive form.	Released in active form.

**2. What are the two intrinsic mechanisms that provide auto regulation of glomerular filtrate? Explain any one of these.**

**Ans.** Two intrinsic mechanisms that provide autoregulation, Myogenic mechanism and Juxtaglomerular apparatus (JGA) JGA – A special cellular apparatus is located in kidney where DCT passes close to Bowman's capsule between afferent and efferent arterioles. The JGA cells secrete rennin that modulate blood pressure there by regulating renal flow and GFR.

**3. How is the permeability of the distal convoluted tubule and the collecting tubule controlled for regulating the water content inside the body?**

**Ans. 1)** When the water content inside the body is low, the osmoreceptors stimulates the adenohypophysis to release vasopressin / ADH.

2) Vasopressin / ADH render the DCT and collecting tubule permeable to water. So, water is reabsorbed.

3) When the water content in the body is normal, there is no release of ADH.

4) The tubule is impermeable to water and water is eliminated in the urine.

**4. Kidneys do not play a major role in excretion in ammonotelic animals. Justify.**

**Ans.** Kidneys do not play any significant role in elimination of ammonia –

(i) Ammonia is readily soluble in water and diffuses across the body surfaces.

(ii) Ammonia is excreted as ammonium ions through gill surface.

**5. Define glomerular filtration rate. What is its value in a healthy human?**

**Ans.** The amount of filtrate formed by kidneys per minute is known as Glomerular filtration rate. (GFR). In a healthy individual, GFR is approx. 125ml / minute i.e. 180 liters per day.

**6. What is the significance of frog's tadpole being ammonotelic and the adult frog being ureotelic?**

**Ans.** Tadpole is ammonotelic, because excretion of ammonia requires a large volume of water, which the tadpole has in its surrounding. An adult frog is ureotelic because elimination of urea requires a moderate volume of water that is much less compared to ammonia.

**7. Describe the blood vessels called vasa rectae found in relation to uriniferous tubules. What is their function?**

**Ans.** Vasa recta are u-shaped, thin walled capillaries that arise from the efferent arteriole; they run parallel to Henle's loop.

They retain the reabsorbed ions in the medullary tissue fluid and maintain its high osmolarity.

**8.What is chief nitrogenous waste product in birds? Give two advantages of this mode of excretion.**

**Ans.** Chief nitrogenous waste product of bird is uric acid.

It is advantageous to them as –

**(i)** Uric acid requires very little or no water for its elimination.

**(ii)** Uric acid is far less toxic and can be eliminated slowly.

**9.Terrestrial animals are generally either ureotelic or uricotelic, Not ammonotelic. Why?**

**Ans.** Ammonia is highly toxic and it has to be eliminated as rapidly as it is formed.

- Land animals have an integument that is impervious to gas exchange.
- It requires a large volume of water needed for elimination
- They do not have access to such a large volume of water needed for elimination of ammonia.
- So they are ureotelic or uricotelic.

**10. Name two metabolic disorders which can be diagnosed by the analysis of urine.**

**Ans.** Glycosuria, Ketonuria.

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**3 Marks Questions**

**1. Person suffering from very low blood pressure pass no urine why? What suggestion would you offer for the removal of waste products from the blood in such a situation.**

**Ans.** It is because, the blood to pass through the glomerulus of the nephron must have required amount of pressure in it. If the pressure is not sufficient it will not flow through glomerulus and filtration would not take place, hence no urine would be formed. This is quite harmful to the person as waste products go on accumulating in the body.

To avoid this, a person should be advised take sufficient amount of water and medicine to keep the blood pressure at optimum level.

**2. Explain briefly how micturation is a reflex process; but is also under some voluntary control.**

**Ans. 1)** Micturation is act of voiding urine

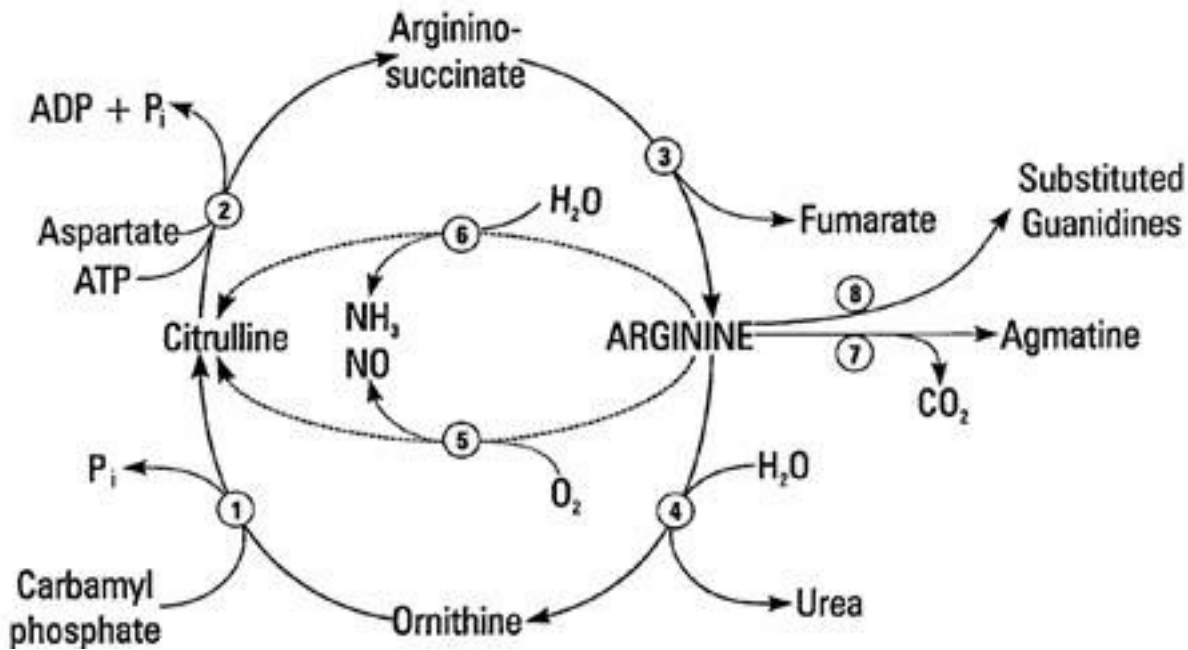
**2)** It is accomplished by the simultaneous contraction of the smooth muscles of urinary bladder wall and the relaxation of the skeletal muscle sphincters around the opening of the bladder.

**3)** As the bladder wall becomes stretched due to accumulation of urine, the stretch receptors in the wall of the bladder generate nerve impulse that are carried to sense neurons to the spinal cord and brain produce the sensation of fullness.

**4)** But the sphincter muscles can also be relaxed voluntarily and thereby the smooth muscles of the bladder are allowed to contract under autonomic control and the content of the bladder can be emptied.

**3. Describe urea cycle.**

**Ans.** It is called kreb's Ornitnine cycle.



#### 4. What is a dialysis machine? When is it needed?

**Ans.** Dialysis machine is also known as artificial kidney. It filters blood when the kidneys fail. In dialysis small solute molecules diffuse through a semi permeable membrane as a substitute for glomerulus. It has a cellophane membrane where the blood of a patient is made to flow on one side of the membrane and the surrounding fluid on other side. The wastes from the blood move into the surrounding fluid through cellophane membrane. It is needed when kidney fails to work and urine is not formed.

#### 5. Suppose the kidneys of a person are damaged, can you predict what is going to happen to him?

**Ans.** The kidneys are considered as master chemists of the body. If they are damaged, it would disturb the normal functioning of the life processes. Due to the effect of toxins produced by some bacteria the fillers of tiny uriniferous tubules are damaged. They become perforated with larger holes and allow blood cells, proteins also to pass through them along with the urea and water during filtration of blood in formation of urine. Thus urine contains the blood proteins etc. It is a serious disease.



**6. How does liver both as a digestive as well as an excretory organ?**

**Ans.** Liver serve as digestive organ – It secretes bile; bile helps in the digestion of fats.

Liver serve as excretory organ - It secretes following waste products in the bile; bilirubin, biliverdin (products of degradation of haemoglobin), cholesterol, inactivated steroid hormones, drugs, etc in the bile; these wastes are eliminated along with the digestive wastes or faecal matter.

**7. Give three point of difference between rennin and Renin.**

**Ans.**

<b>Rennin</b>	<b>Renin</b>
<b>(i)It is a proteolytic enzyme</b> <b>(ii) It helps in the digestion of milk proten casein</b> <b>(iii) It is secreted as an inactive form prorennin which is activated to rennin by HCl.</b> <b>(iv) Its secretion is stimulated by food.</b>	<b>(i)It is a hormone that acts as an enzyme.</b> <b>(ii) It converts the protein angiotensinogen into angiotensin</b> <b>(iii) It is secreted as rennin</b>  <b>(iv) It secretion is stimulated by a reduction of Na<sup>+</sup>level in tissue flunid. (---- any three)</b>

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**5 Marks Questions**

**1. Describe briefly the structure and function of renal corpuscle.**

**Ans.** Renal Corpuscle – It is the main excretory organ in the kidney. Nephrons are the functional units of kidney of renal corpuscle. There are about 102 million nephrons in each kidney in man.

Structure of nephron – The nephron is a thin, long, twisted tubular structure. The tubule of each nephron starts as a up – shaped called Bowman’s capsule. There is a globular tuft of capillaries in the hollow of the cup. The Bowman’s capsule and the glomerulus together form a globular body called the renal corpuscle. Blood enters the glomerular capillaries through an afferent arteriole and leaves the glomerulus through as efferent arteriole.

Urine is formed by the filtration of a protein free fluid from the glomerulus into lumen of the Bowman’s capsule.

There are 3 parts of a nephron –

- (i)** proximal nephron
- (ii)** hoop of Henle and
- (iii)** distal nephron.

A long highly coiled and tubule trusted starts form the neck of the Bowman’s capsule. It is called the PCT (Proximal Convoluted tubule). It continues into a thin-walled straight tubule, then loops like segment of the tubule is called the Henle’s loop. It has thin descending limb and thick ascending limb. The Henle’s loop continuous into another segment of coiled and twisted tubule called DCT (Distal convoluted tubule). The terminal part of DCT is a straight short tubule called the collecting duct. The collecting duct runs down to the medulla again

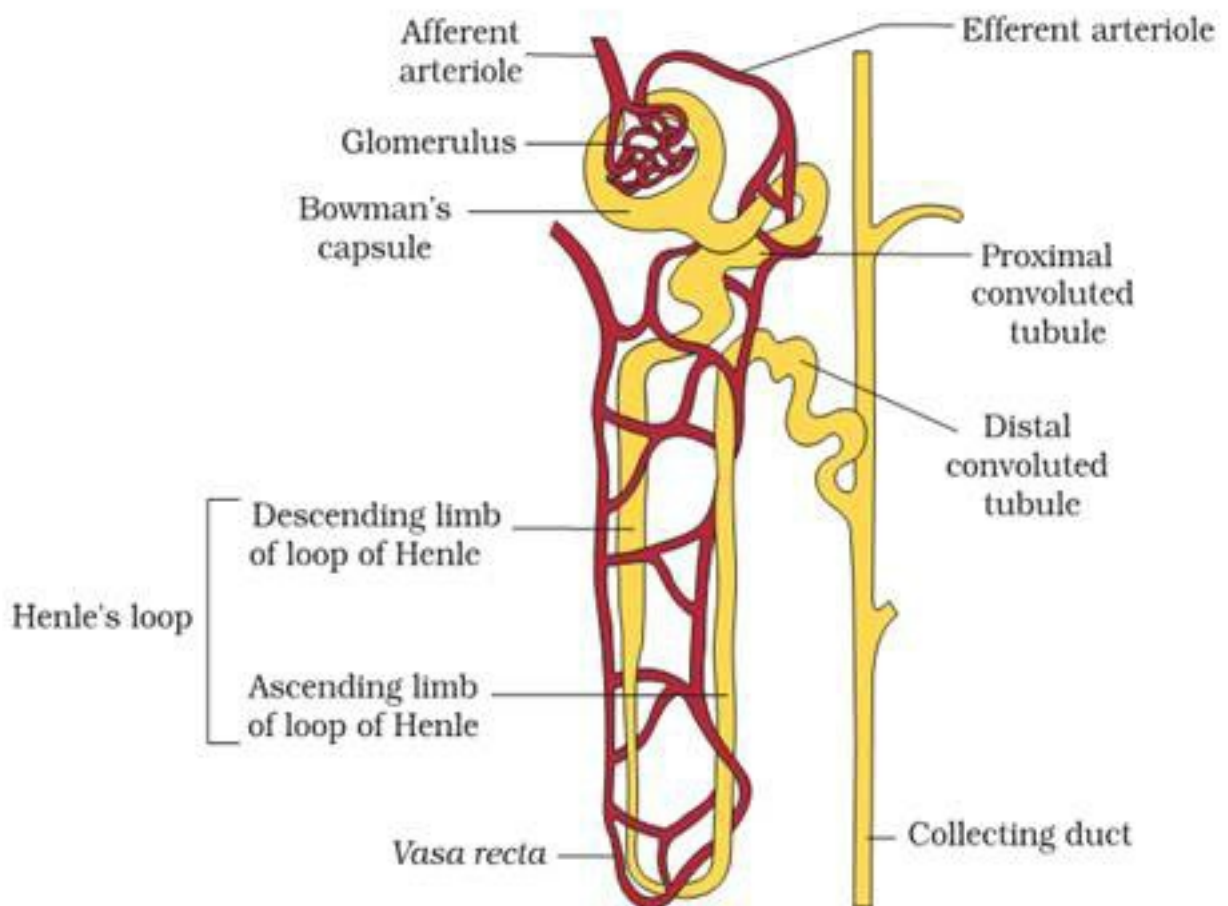
conducting the collected urine towards the medulla.

The collecting ducts unite with each other in the medulla to form the larger ducts called Ducts of Bellini. These ducts run through the renal pyramids and open into renal pelvis.

The efferent arteriole gives a capillary network around the tubule in the cortex. It also gives rise to some parallel wise, thin walled straight capillaries called vasa rectae. They help to maintain reabsorbed ions and urea in the interstitial fluid and maintain osmotic pressure in the kidney.

Functions – Various part of nephron perform different function but the main function is liberation of metabolic waste from the body and maintain osmotic pressure of fluid in the

body.



**Figure 19.3** A diagrammatic representation of a nephron showing blood vessels, duct and tubule

## 2. Describe the mechanism of urine formation.

**Ans.** Urine formation involves three main processes –

**(i)** Glomerular filtration – A protein – free fluid is filtered from blood of glomerular capillaries into the lumen of Bowman's capsule.

The filtration occurs through three layers, which form the filtration membrane; they are :

**(i)** Endothelium of glomerular capillaries

**(ii)** Epithelium of Bowman's capsule.

**(iii)** Basement membrane between the two layers.

The epithelial cells or podocytes of the Bowman's capsule are arranged in an intricate manner, to leave some filtration slits.

The blood is filtered so finely that the composition of filtrate is very similar to plasma except for the plasma proteins.

The glomerular filtrate rate is about (25ml / min)

**(ii)** Reabsorption -

Nearly 90% of the filtrate is reabsorbed in the renal tubule of the epithelial cells of the lining of renal tubule.

Certain substances like glucose, amino acids,  $\text{Na}^+$  ions,  $\text{K}^+$  ions and  $\text{Ca}^{2+}$  ions are reabsorbed actively.

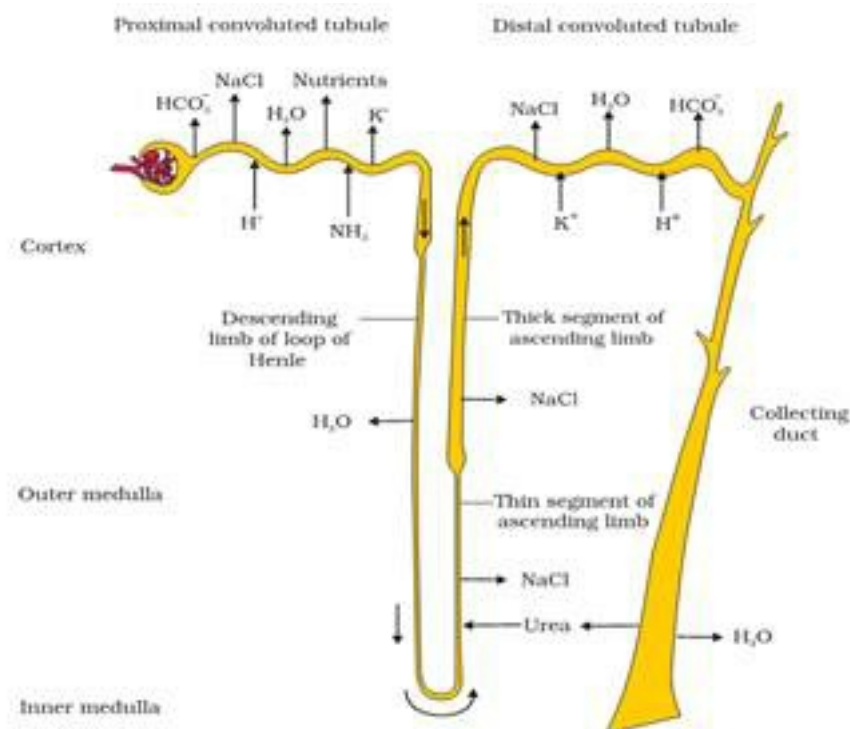
Water is reabsorbed passively by osmosis.

Certain other substance like  $\text{Cl}^-$  ions are absorbed passively.

**(iii)** Tubular secretion –

It is the process by which certain substances / ions like  $\text{K}^+$  and ammonia are directly secreted into the lumen of the nephron.

The step is important in urine formation, as it helps to maintain the ionic balance and PH of the body fluids.



**Figure 19.5** Reabsorption and secretion of major substances at different parts of the nephron (Arrows indicate direction of movement of materials.)

### 3. Describe the renal excretory system of man.

Ans. The urinary system consist of following organs.

**(a)** A pair of kidneys

**(b)** A pair of ureters

**(c)** Urinary bladder

**(d)** Urethra kidney – The kidneys are located in the abdomen, one on each side of the vertebral column just below the diaphragm, which remains protected by last two pairs of ribs.. The left kidney is usually placed higher than right one. Each kidney is 10cm in length 5 cm in breadth and 4cm in thickness. Each kidney is somewhat bean shaped with concavity along the inner border. Blood vessels, nerves, lymph ducts and ureters enter the kidney at this point. In the gross anatomy of kidney, two regions can be clearly marked out. There are outer cortex and inner medulla.

Internal structure of kidney – Each kidney composed of several tiny units called nephrons or uriniferous tubule, all similar in structure and function. Each nephron is made up of

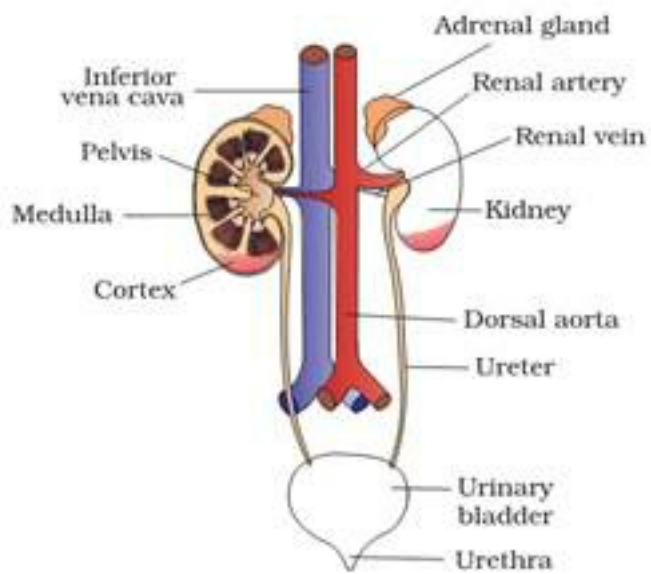
vascular component, the glomerulus and tubular component, and surrounded by a network of capillaries. The tubule is composed of single layer of epithelial cells which differ in structure and function in different parts of the tubule. The tubule originates as a blind sac, which is known as Bowman's capsule which is lined by a single layer of thin epithelial cells – Bowman's capsule is ultimately associated with vascular glomerulus which protrudes into Bowman's capsule and is completely covered by the lining of the capsule. The glomerulus is formed by afferent and efferent arterioles. The afferent arterioles bring blood to the tubular and efferent arterioles takes blood away from the tubule. Due to this, the blood in the glomerulus is separated from the space within the capsule only by (a) a thin layer of a tissue composed of the single – celled capillary lining (b) a layer material called basement membrane and (c) the single celled lining of Bowman's capsule. This extremely thin barrier permits the filtration of the fluid from the capillaries into Bowman's capsule.

The glomerular capillaries combine together to form efferent arterioles which further divide into many capillaries distributed all over the surface of the tubule. These capillaries are termed as peritubular capillaries. These capillaries join together to form the venous channels which take blood away from the kidney. The tubule is divided into three parts – Proximal convoluted part in which Bowman's capsule opens. The next part is Henle's loop and last part is distal convoluted part which finally runs as a collecting duct.

Ureters – These are two tubes or about 30 cm long – one coming out from each kidney. They run downwards and open into urinary bladder.

Urinary bladder- It is a bag like structure where urine is stored. The bladder has three openings two of the ureters and one to urethra.

Urethra – the urethra is the passage through which urine is passed out.



**Figure 19.1** Human Urinary system