

**Class: 11**  
**Subject: Biology**  
**Topic: Excretory Products and their Elimination**  
**No. of Questions: 25**

Q1. What are nephrons?

Sol. Renal tubules for excretion in man are called nephrons.

Q2. The chances of kidney failure are more in those who have high pressure. Why?

Sol. The chances of kidney failure are more in those who have high pressure because ultra-filtration under abnormal high blood pressure may rupture the capacity walls of the glomeruli leading to kidney failure.

Q3. What is sweat?

Sol. Sweat is the secretory product of sweat glands.

Q4. What is ureotelism?

Sol. The process of excretion of urea in the case of mammals, amphibians and cartilaginous fishes is called ureotelism.

Q5. What is reabsorption described as a selective process?

Sol. The reabsorption process is said to be selective as certain essential substances are absorbed back into the blood while the wastes are retained in the filtrate. Distal and collecting tubules are parts of the nephron where reabsorption by active transport takes place.

Q6. What is the basic nitrogenous catabolic product of metabolism?

Sol. Ammonia is the basic nitrogenous catabolic product of metabolism.

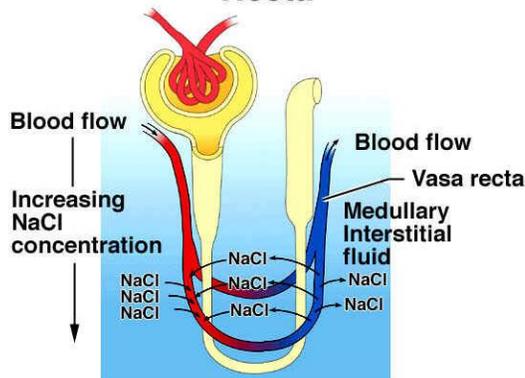
Q7. Describe the role of ADH and counter current system in the formation of hypertonic urine.

Sol. Role of ADH

Antidiuretic hormone (ADH) is secreted by the posterior lobe of the pituitary gland. ADH promotes the reabsorption of water by distal convoluted tubules and controls the amount of water excreted in urine. It increases the permeability of the membrane of the collecting tubules. Absences of ADH make the collecting tubules permeable to water. So less water is returned to the blood from urine by osmosis. Hence, ADH helps to conserve water. If the production of ADH is less, it could result enormous loss of water from the kidneys.

Counter current system in the formation of hypertonic urine

### Countercurrent Mechanism—Vasa Recta



When the amount of water is more than that needed by the organism, the walls of the distal convoluted tubules and collecting duct remain impermeable to water. The filtrate becomes more and more dilute and ultimately a large volume of hypertonic urine is excreted. When water is less, the walls of the distal convoluted tubules and collecting duct becomes permeable to water. The surrounding tissue is hypertonic due to active reabsorption of  $\text{Na}^+$  and due to the retention of urea in the counter current system of the vasa recta. So water from walls of the duct get reabsorbed into the surrounding tissue and peritubular capillaries. The filtrate in the collecting duct becomes hypertonic and strongly hypertonic urine flows out into the renal pelvis.

Q8. What are the parts of renal corpuscle?

Sol. The parts of renal corpuscle are

- (a) Bowman's capsule and
- (b) Glomerulus.

Q9. Mention the difference between uricotelism and ureotelism.

Sol. The difference between uricotelism and uretelism are as follows:

Uricotelism	Ureotelism
(i) The excretory product is uric acid.	(i) The excretory product is urea.
(ii) It is less toxic	(ii) It is more toxic
(iii) Less water is required for elimination	(iii) More water is required for elimination.
(iv) It is insoluble in water.	(iv) It is soluble in water.
(v) More energy is required in water.	(v) Less energy is required.

Q10. Define osmolarity.

Sol. Osmolarity is the total solute concentration of two solutions.

Q11. What are normal and abnormal constituents of urine?

Sol. Normal urine contains as much as 95% water in which about 5% of other organic and inorganic substances are found in a dissolved state. The inorganic substances in urea are salts of sodium, potassium, etc. The organic substances are urea, uric acid creatinine, etc. If the percentage of any of the above increases their normal limits, the composition of urine becomes abnormal. Sometimes, the concentration of urine is disturbed by the secretion of substances like glucose, acetones, ketones, etc.

Q12. How does the liver serve both as a digestive as well as excretory organ?

Sol. The liver secretes bile containing bile pigments and bile salts. The bile salts help in digesting and absorbing fat. The liver is also considered as the principal organ for excretion as it is involved in the excretion of cholesterol. The inactivated products of steroid hormone, cholesterol and drugs are carried by bile to the intestine and ultimately eliminated with the feces.

Q13. In which animal malpighian tubules act as excretory organ?

Sol. Cockroach and grasshopper

Q14. What are chloride cells?

Sol. Ionocytes are special cells in the gill membrane of fresh water fish. They are called chloride cells.

Q15. Is the ultra filtration in the glomerulus a passive or active process?

Sol. The ultra filtration in the glomerulus is a passive process.

Q16. Name two high threshold substances.

Sol. Glucose and amino acid are the two high threshold substance

Q17. Expanded RAAS.

Sol. The expansion for RAAS is Renin Angiotension Aldosterone system.

Q18. What happens to the walls of distal convoluted tubule (DCT) of a nephron when vasopressin is released by the pituitary into the blood stream?

Sol. The walls of DCT of a nephron becomes permeable to water when vasopressin (ADH) is released into blood by pituitary

Q19. What are the chief excretory products in human beings?

Sol. The excretory products of human can be classified in to the following categories

- (a) Carbonaceous – Carbon dioxide is produced as a result of respiration
- (b) Nitrogenous – Containing urea.
- (c) Others – such as bile pigments, water , excess of salts etc.

Q20. What are the two modes of tubular reabsorption from the nephrons? Name the substances absorbed by each of these modes.

Sol. The two modes of tubular reabsorption from the nephrons are

- (a) Active
- (b) Passive

The active absorption of glucose and amino acids takes place in proximal convoluted tubules which open into Henle's loop.

The sodium and potassium are reabsorbed actively in distal convoluted tubules. It is a fast process. Finally the water is reabsorbed.

Q21. Why is reabsorption described as a selective process?

Sol. Ultra filtration takes place in glomerulus. The glomerulus filtrate contains essential or useful substance like water, glucose, amino acids, chlorides and sodium along with wastes like urea, creatinine and uric acid.

Q22. Where does ultrafiltration, reabsorption and secretion of substance take place in nephron?

Sol. Ultra filtration takes place in glomerulus and Bowman's capsule of the nephron. Reabsorption takes place in the first coiled tube called the Loop of Henle and second coiled tube. Secretion takes place in cells of proximal and distal tubules. The main substances secreted are potassium, ammonia, creatinine and very little uric acid

Q23. How does liver helps in the process of excretion?

Sol. Liver plays a minor role in excreting waste products from the body. Urea, the chief nitrogenous waste material is formed in the liver. Ammonia is converted into urea in the liver. This urea is eventually thrown out by kidneys. Liver manufactures bile pigments from the hemoglobin of the red blood cells and through the bile duct it passes into the intestine

Q24. If one, drinks very little water, the volume of urine decreases. In what way does it affect his health?

Sol. The ammonia formed due to the break down of proteins combines with carbon dioxide to form urea. Urea is toxic to the body if present in large quantity. It is soluble in water and excreted from the body in the form of urine. It has been estimated that about one litre of water is needed every day in human beings to wash out urea from the body. If one drinks lesser amount of water, the concentration of urea will increase, thus urea deposited in the cells would disturb the chemical composition of protoplasm crippling the life activities.

Q25. How does urine formation help in maintain the correct composition of blood?

Sol. As a result of metabolism various substances are continuously formed. These wastes are added in the blood. Due to the addition of lactic acid, carbonic acid the blood salts becoming acidic. Kidneys remove all these substances from the blood with the urine. Thus by urine formation the blood composition is kept normal and also blood remains alkaline.