

	INDIAN SCHOOL AL WADI AL KABIR	
CLASS: XI	DEPARTMENT OF SCIENCE 2025-26 SUBJECT: BIOLOGY	DATE: 18/08/2025
WORKSHEET 6	Unit V Human Physiology CH:16 Excretory products and their elimination	NOTE: A4 FILE FORMAT
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO:

I. MULTIPLE CHOICE QUESTIONS (1M)

- Bony fishes eliminate their nitrogenous waste material in the form of:
 - Ammonia
 - Urea
 - Uric acid
 - Both B and C
- Which of the following is the primary nitrogenous waste in humans?
 - Ammonia
 - Urea
 - Uric acid
 - Creatinine
- The functional unit of the kidney is called:
 - Nephron
 - Bowman's capsule
 - Glomerulus
 - Loop of Henle
- Which of the following is reabsorbed in the proximal convoluted tubule?
 - Urea
 - Glucose
 - Creatinine
 - Uric acid
- The hormone responsible for regulating water reabsorption in the kidneys is:
 - Insulin
 - Glucagon
 - Antidiuretic hormone (ADH)
 - Thyroxine

6. Which of the following processes occurs in the glomerulus?
 - A. Tubular secretion
 - B. Filtration
 - C. Reabsorption
 - D. Concentration of urine
7. Which of the following is not a function of the urinary system?
 - A. Regulation of blood pressure
 - B. Filtration of blood
 - C. Synthesis of digestive enzymes
 - D. Removal of metabolic waste products

Two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

- A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- B. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- C. Assertion (A) is true, Reason (R) is false.
- D. Assertion (A) is false, Reason (R) is true.

8. **Assertion (A):** The kidneys maintain the pH and ionic balance of the body fluids.
Reason (R): The process of selective reabsorption and secretion in the nephron helps in osmoregulation.
9. **Assertion (A):** The descending limb of the Loop of Henle is impermeable to water.
Reason (R): The Loop of Henle concentrates the filtrate by allowing water to leave the descending limb and salts to leave the ascending limb.
10. **Assertion (A):** Uric acid is the main excretory product in birds and reptiles.
Reason (R): Birds and reptiles are ureotelic organisms.
11. **Assertion (A):** In humans, urea is synthesized in the liver.
Reason (R): The ornithine cycle (urea cycle) occurs in the kidney.
12. **Assertion (A):** ADH increases the reabsorption of water in the distal tubules and collecting ducts of the kidney.
Reason (R): ADH secretion is stimulated by high blood osmolarity or low blood volume.

II. SHORT ANSWER TYPE QUESTIONS (2 MARKS EACH)

13. What are the primary excretory products in animals?
14. What is the role of the glomerulus in urine formation?
15. Define osmoregulation. How do kidneys contribute to it?
16. Name two hormones that regulate kidney function and state their functions.

III. LONG ANSWER TYPE QUESTION (3 MARK EACH)

17. Describe the role of the Loop of Henle in the concentration of urine.
18. Explain the difference between urea, uric acid, and ammonia as excretory products.
19. What are the differences between glomerular filtration, tubular reabsorption, and tubular secretion?

20. How have terrestrial organisms adapted themselves for the conservation of water?

IV. CASE STUDY BASED QUESTIONS (4M)

21. Read the given passage & answer the following Questions:

Urine formation involves three main processes namely glomerular filtration, reabsorption and secretion. That takes place in different parts of the nephron. The first step in urine formation is the filtration of the blood, which is carried out by the glomerulus and is called glomerular filtration on an average 1100 to 1200 ml of blood is filtered by the kidneys per minute which constitute of $\frac{1}{5}$ of the blood pump out by each ventricle of the heart in a minute. In the glomerular capillary blood pressure causes filtration of blood through three layers, that are the endothelium of glomerular blood vessels, the epithelium of Bowman's capsule and a basement membrane between the two layers the endothelium cells and epithelial cells of Bowman's capsule called podocytes are arranged in an intrinsic manner so as to leave some minute space called filtration slits. Blood is filter so finely through membrane that almost all the constituents of the plasma except the proteins pass on to the lumen of Bowman's capsule therefore it is considered as a process of ultra-filtration.

- A. Which cells arranged in a such a way that lead to making the filtration splits?
- B. How many layers are found between glomerulus and Bowman's capsule?
- C. How much blood is filtered by the kidney per minute?

OR

- D. What is the first stage of urine formation?

V. VERY LONG ANSWER TYPE QUESTIONS (5 MARK EACH)

22. Describe the process of urine formation in the nephron.

23. Explain the role of ADH and aldosterone in the regulation of kidney function.

ANSWERS

S.No	
I	Multiple Choice Questions (MCQs)
1	A. Ammonia
2	B. Urea
3	A. Nephron
4	B. Glucose
5	C. Antidiuretic hormone (ADH)
6	B. Filtration
7	C. Synthesis of digestive enzymes
	Assertion and Reason Questions
8	A) Both A and R are true, and R is the correct explanation of A
9	D) A is false, but R is true.
10	C) A is true, but R is false.
11	C) A is true, but R is false.
12	A) Both A and R are true, and R is the correct explanation of A.
II	SHORT ANSWER TYPE QUESTIONS (2 MARKS EACH)

13	The primary excretory products in animals are: Ammonia: It is the most toxic form and requires large amount of water for its elimination, Urea: Ammonia is converted into urea in the liver and released into the blood which is filtered and excreted out by the kidneys via urine. Uric acid: Being the least toxic, can be removed with a minimum loss of water.
14	The glomerulus performs the first step in urine formation by filtering blood. It allows small molecules like water, glucose, salts, and urea to pass into the Bowman's capsule while retaining larger molecules like proteins and blood cells.
15	Osmoregulation is the maintenance of the balance of water and solutes in the body. Kidneys regulate this balance by: • Reabsorbing water in the nephron. • Controlling the excretion of salts and ions, depending on the body's needs.
16	Antidiuretic hormone (ADH): Increases water reabsorption in the distal tubules and collecting ducts. Aldosterone: Regulates sodium and potassium balance by increasing sodium reabsorption and potassium excretion.
III	LONG ANSWER TYPE QUESTION (3 MARK EACH)
17	The Loop of Henle creates a counter-current mechanism to concentrate urine. Descending limb: Permeable to water, leading to water reabsorption and increased filtrate osmolarity. Ascending limb: Impermeable to water but actively transports sodium and chloride ions into the interstitial fluid, reducing filtrate osmolarity. This gradient helps the collecting duct to reabsorb water under ADH influence.
18	Urea: Found in humans and most mammals, moderately toxic, and water-soluble. Uric acid: Found in birds and reptiles, least toxic, and excreted as a paste to conserve water. Ammonia: Found in aquatic animals, highly toxic, and excreted directly in large amounts of water.
19	Glomerular filtration: Blood is filtered in the glomerulus, and filtrate containing water, salts, glucose, and urea enters Bowman's capsule. Tubular reabsorption: Essential substances like glucose, amino acids, and ions are reabsorbed into the blood from the nephron. Tubular secretion: Additional waste products like hydrogen ions and drugs are secreted from the blood into the nephron tubules for excretion.
20	Terrestrial adaptation requires the production of less toxic nitrogenous waste like urea and uric acid to conserve water. Ammonia excreted by aquatic animals requires a large amount of water to dissolve. But for terrestrial animals, such a huge amount of water is unnecessary. They need less water for excretion and are either ureotelic or uricotelic.
21	CASE STUDY BASED QUESTIONS (4M)
.A	The cells are called podocytes, which found in the epithelium cells of Bowman's capsule and arranged in an intrinsic manner, so as to leave some minute space called filtration slits.

B	-There are three layers found between the glomerulus and Bowman's capsule and they are called as endothelium of glomerulus blood vessel the epithelium of Bowman's capsule and basement membrane between these two layers.
C	About 1100 to 1200 ml of the blood is filtered by the kidney per minute
D	Ultra-filtration.
V	LONG ANSWER TYPE QUESTIONS (5 MARK EACH)
22	Urine formation involves the following steps: Glomerular Filtration: Blood is filtered in the glomerulus, and the filtrate enters Bowman's capsule. This filtrate contains water, salts, glucose, amino acids, and nitrogenous wastes. Tubular Reabsorption: Essential nutrients, ions, and water are reabsorbed from the filtrate into the surrounding capillaries. For example, glucose and amino acids are reabsorbed in the proximal convoluted tubule. Tubular Secretion: Unwanted substances like hydrogen ions, potassium, and drugs are actively secreted into the tubular filtrate from the blood. Concentration of Urine: In the Loop of Henle and collecting ducts, water is reabsorbed under the influence of ADH, concentrating the urine.
23	Antidiuretic Hormone (ADH): • Secreted by the posterior pituitary gland. • Increases the permeability of the distal tubules and collecting ducts to water, promoting water reabsorption. • Helps conserve water during dehydration. Aldosterone: • Secreted by the adrenal cortex. • Increases sodium reabsorption and potassium excretion in the distal tubule. • This increases water reabsorption indirectly, maintaining blood pressure and fluid balance.

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