

Q1. The main nitrogenous waste product in humans is:

- A. Ammonia
- B. Urea
- C. Uric acid
- D. Creatinine

Answer: B. Urea

Explanation: Humans are ureotelic, excreting urea formed in the liver from ammonia via the ornithine cycle.

Q2. Which of the following organisms is uricotelic?

- A. Human
- B. Frog
- C. Pigeon
- D. Dog

Answer: C. Pigeon

Explanation: Birds like pigeons are uricotelic, excreting uric acid, which is less toxic and conserves water.

Q3. The process of ultrafiltration in the nephron occurs at:

- A. Loop of Henle
- B. Collecting duct
- C. Bowman's capsule
- D. Distal convoluted tubule

Answer: C. Bowman's capsule

Explanation: Ultrafiltration takes place in the renal corpuscle (Bowman's capsule + glomerulus) under high pressure.

Q4. Which component is not normally found in the filtrate?

- A. Glucose
- B. Amino acids
- C. Plasma proteins
- D. Urea

Answer: C. Plasma proteins

Explanation: Plasma proteins are too large to pass through the glomerular membrane and remain in the blood.

Q5. Which part of the nephron plays a major role in selective reabsorption?

- A. Loop of Henle
- B. Collecting duct
- C. Proximal convoluted tubule
- D. Bowman's capsule

Answer: C. Proximal convoluted tubule

Explanation: PCT is responsible for most selective reabsorption of water, ions, glucose, and amino acids.

Q6. Counter-current mechanism in kidneys helps in:

- A. Producing hypotonic urine
- B. Increasing blood pressure
- C. Reabsorbing glucose
- D. Concentration of urine

Answer: D. Concentration of urine

Explanation: The counter-current mechanism between Loop of Henle and vasa recta helps in maintaining a high osmolarity in the medulla for water reabsorption.

Q7. Which hormone regulates water reabsorption in the distal tubule and collecting duct?

- A. Renin
- B. ANF
- C. ADH
- D. Aldosterone

Answer: C. ADH

Explanation: Antidiuretic hormone (ADH) increases water reabsorption, thus concentrating urine.

Q8. A decrease in ADH secretion leads to:

- A. Increased blood pressure

- B. Concentrated urine
- C. Increased water reabsorption
- D. Diuresis

Answer: D. Diuresis

Explanation: Less ADH = less water reabsorption, causing diuresis (production of large volume of dilute urine).

Q9. The presence of glucose in urine indicates:

- A. Jaundice
- B. Ketosis
- C. Glycosuria
- D. Uremia

Answer: C. Glycosuria

Explanation: Glycosuria is the excretion of glucose in urine, commonly seen in diabetes mellitus.

Q10. Which hormone is secreted by JGA (Juxtaglomerular apparatus)?

- A. ADH
- B. Aldosterone
- C. Renin
- D. ANF

Answer: C. Renin

Explanation: Renin, secreted by JGA, initiates the RAAS pathway to regulate blood pressure and GFR.

Q11. The minimum volume of urine required per day to excrete body waste is:

- A. 100 mL
- B. 500 mL
- C. 1 liter
- D. 2 liters

Answer: B. 500 mL

Explanation: At least 500 mL/day is necessary to remove nitrogenous wastes (called obligatory water loss).

Q12. Which condition results from failure of kidneys to excrete urea?

- A. Gout
- B. Uremia
- C. Glycosuria
- D. Hematuria

Answer: B. Uremia

Explanation: In uremia, urea accumulates in the blood due to kidney failure.

Q13. Which part of the nephron is impermeable to water?

- A. Descending limb of loop of Henle
- B. Ascending limb of loop of Henle
- C. Collecting duct
- D. Proximal convoluted tubule

Answer: B. Ascending limb of loop of Henle

Explanation: Ascending limb is impermeable to water but allows salt reabsorption, contributing to counter-current mechanism.

Q14. What is the function of vasa recta?

- A. Reabsorption of glucose
- B. Maintain salt gradient in medulla
- C. Filtration of blood
- D. Secretion of ADH

Answer: B. Maintain salt gradient in medulla

Explanation: Vasa recta helps in maintaining osmotic gradient essential for urine concentration.

Q15. Which of the following is not a function of the kidneys?

- A. Regulation of blood pH
- B. Production of erythropoietin
- C. Detoxification of ammonia
- D. Reabsorption of essential nutrients

Answer: C. Detoxification of ammonia

Explanation: Ammonia is converted to urea in the liver, not kidneys. Kidneys excrete urea.

Q16. Which of the following processes is not involved in urine formation?

- A. Ultrafiltration
- B. Selective reabsorption
- C. Tubular secretion
- D. Deamination

Answer: D. Deamination

Explanation: Deamination (removal of amino groups from amino acids) occurs in the liver, not in the kidney. The other three are steps in urine formation.

Q17. The functional unit of the kidney is:

- A. Collecting duct
- B. Glomerulus
- C. Nephron
- D. Bowman's capsule

Answer: C. Nephron

Explanation: Nephron is the structural and functional unit of the kidney, responsible for filtering blood and forming urine.

Q18. Which part of the nephron plays a major role in maintaining the concentration gradient in the medulla?

- A. Proximal convoluted tubule
- B. Loop of Henle
- C. Distal convoluted tubule
- D. Bowman's capsule

Answer: B. Loop of Henle

Explanation: Loop of Henle creates a concentration gradient through a counter-current mechanism, crucial for water reabsorption.

Q19. Which hormone increases water reabsorption in the distal tubule and collecting duct?

- A. Aldosterone
- B. Renin
- C. ADH
- D. Atrial natriuretic factor

Answer: C. ADH

Explanation: Antidiuretic hormone (ADH) increases water permeability in the distal tubule and collecting duct, reducing urine output.

Q20. Which of the following statements is incorrect regarding glomerular filtration?

- A. It is a passive process
- B. Glomerular capillary pressure is ~55 mm Hg
- C. Filtration membrane allows passage of all plasma proteins
- D. It occurs in Bowman's capsule

Answer: C. Filtration membrane allows passage of all plasma proteins

Explanation: Large plasma proteins cannot pass through the filtration membrane due to size and charge; hence, this statement is incorrect.

Q21. The counter-current system that concentrates urine involves:

- A. PCT and DCT
- B. Loop of Henle and vasa recta
- C. Glomerulus and peritubular capillaries
- D. Collecting duct and renal pelvis

Answer: B. Loop of Henle and vasa recta

Explanation: These two form a counter-current arrangement that helps in maintaining hyperosmotic medullary interstitium, concentrating urine.

Q22. Which of the following is most reabsorbed in the proximal convoluted tubule?

- A. Sodium
- B. Glucose
- C. Urea
- D. Potassium

Answer: B. Glucose

Explanation: 100% of glucose (under normal conditions) is reabsorbed in PCT by active transport mechanisms.

Q23. Which condition is caused due to decreased secretion of ADH?

- A. Uremia
- B. Diabetes mellitus
- C. Diabetes insipidus
- D. Glomerulonephritis

Answer: C. Diabetes insipidus

Explanation: Diabetes insipidus results from ADH deficiency, leading to large volumes of dilute urine and dehydration.

Q24. The process of micturition is controlled by:

- A. Voluntary skeletal muscles only
- B. Involuntary smooth muscles only
- C. Both voluntary and involuntary muscles
- D. Sympathetic nervous system only

Answer: C. Both voluntary and involuntary muscles

Explanation: The bladder is made of smooth muscle (involuntary), while the external sphincter is under voluntary control.

Q25. Choose the correct match:

Substance	Mechanism of Reabsorption
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- | | |
|------------------|----------------------------|
| A. Na^+ | Passive diffusion |
| B. Glucose | Secondary active transport |
| C. Urea | Active transport |
| D. H^+ | Filtration only |

Answer: B. Glucose – Secondary active transport

Explanation: Glucose is reabsorbed via co-transport with sodium ions using secondary active transport in the PCT.

Q26. Which of the following will be most affected if the glomerular filtration rate (GFR) decreases?

- A. Blood pressure
- B. Water reabsorption
- C. Creatinine clearance
- D. Erythropoietin release

Answer: C. Creatinine clearance

Explanation: Creatinine clearance is directly used to estimate GFR; hence a decrease in GFR reduces creatinine clearance rate.

Q27. Aldosterone acts on:

- A. Proximal convoluted tubule to reabsorb water
- B. Loop of Henle to reabsorb glucose
- C. Distal convoluted tubule to reabsorb Na^+ and water
- D. Bowman's capsule to increase pressure

Answer: C. Distal convoluted tubule to reabsorb Na^+ and water

Explanation: Aldosterone enhances Na^+ reabsorption in the DCT and collecting duct, indirectly increasing water reabsorption.

Q28. Which nitrogenous waste is excreted in the maximum quantity in humans?

- A. Ammonia
- B. Urea
- C. Uric acid
- D. Creatinine

Answer: B. Urea

Explanation: Humans are ureotelic — urea is the main nitrogenous waste, formed in the liver and excreted via kidneys.

Q29. Which part of the nephron helps in maintaining the pH of body fluids?

- A. Bowman's capsule
- B. PCT
- C. Loop of Henle
- D. DCT

Answer: D. DCT

Explanation: Distal convoluted tubule helps maintain pH by selective secretion of H^+ and reabsorption of HCO_3^- .

Q30. Uremia is a condition in which:

- A. Blood sugar increases abnormally
- B. Blood urea level rises abnormally
- C. Filtration rate becomes zero
- D. Water is excessively lost

Answer: B. Blood urea level rises abnormally

Explanation: In uremia, urea accumulates in the blood due to poor renal function, which may require dialysis.

Q31. The presence of glucose in urine is known as:

- A. Glucosuria
- B. Proteinuria
- C. Ketonuria
- D. Hematuria

Answer: A. Glucosuria

Explanation: Glucosuria occurs when glucose is not reabsorbed in PCT due to high blood glucose levels (as in diabetes mellitus).

Q32. Which part of the nephron is impermeable to water?

- A. Descending limb of Loop of Henle
- B. Ascending limb of Loop of Henle
- C. Proximal convoluted tubule
- D. Collecting duct

Answer: B. Ascending limb of Loop of Henle

Explanation: This segment is impermeable to water but actively transports Na^+ and Cl^- , helping generate medullary osmotic gradient.

Q33. The main role of vasa recta is to:

- A. Filter plasma
- B. Secrete urine
- C. Maintain osmotic gradient
- D. Reabsorb glucose

Answer: C. Maintain osmotic gradient

Explanation: Vasa recta runs parallel to Loop of Henle and maintains the medullary gradient by counter-current exchange.

Q34. Which hormone promotes sodium reabsorption and potassium secretion?

- A. ADH
- B. ANF
- C. Aldosterone
- D. Renin

Answer: C. Aldosterone

Explanation: Aldosterone increases Na^+ reabsorption and K^+ secretion in DCT and collecting duct to regulate blood volume and pressure.

Q35. In hemodialysis, the dialysing fluid:

- A. Is hypertonic to blood
- B. Is hypotonic to blood
- C. Has same concentration of glucose and salts as plasma but no nitrogenous waste
- D. Has more urea and creatinine

Answer: C.

Explanation: Dialysing fluid is isotonic to blood but lacks nitrogenous wastes, allowing diffusion of wastes from blood into the fluid.

Q36. The urinary bladder stores urine temporarily and its maximum capacity in an adult human is approximately:

- A. 500 mL
- B. 1000 mL
- C. 200 mL
- D. 50 mL

Answer: A. 500 mL

Explanation: The normal capacity of the human bladder is about 500 mL, though the urge to urinate may begin earlier.

Q37. Which of the following would not be found in the urine of a healthy person?

- A. Urea
- B. Sodium
- C. Glucose
- D. Creatinine

Answer: C. Glucose

Explanation: In healthy individuals, glucose is completely reabsorbed in PCT and should not be present in urine.

Q38. Which nitrogenous waste is least toxic and can be stored in the body for some time?

- A. Ammonia
- B. Uric acid
- C. Urea
- D. Creatinine

Answer: B. Uric acid

Explanation: Uric acid is the least toxic, water-insoluble, and excreted as solid paste in uricotelic organisms. Humans excrete small amounts of it.

Q39. In which part of the nephron does most obligatory reabsorption of water take place?

- A. Collecting duct
- B. DCT

- C. PCT
- D. Loop of Henle

Answer: C. PCT

Explanation: PCT reabsorbs about 65–70% of water and all essential nutrients — this reabsorption is obligatory and not hormone dependent.

Q40. A person's urine sample shows presence of albumin. This condition is termed as:

- A. Ketonuria
- B. Proteinuria
- C. Hematuria
- D. Glucosuria

Answer: B. Proteinuria

Explanation: Albumin is a plasma protein, and its presence in urine indicates damage to the glomerular membrane.

Q41. Which of the following is not a function of kidneys?

- A. Regulation of blood pH
- B. Erythropoietin secretion
- C. Regulation of body temperature
- D. Elimination of metabolic wastes

Answer: C. Regulation of body temperature

Explanation: Kidneys are involved in osmoregulation, pH balance, hormone secretion (erythropoietin), and waste removal but not thermoregulation.

Q42. The hormone secreted by the kidney in response to low oxygen levels is:

- A. ADH
- B. Renin
- C. Aldosterone
- D. Erythropoietin

Answer: D. Erythropoietin

Explanation: Erythropoietin stimulates bone marrow to produce RBCs in response to hypoxia (low oxygen).

Q43. The condition in which renal calculi (kidney stones) are formed due to crystallisation of calcium salts is called:

- A. Uremia
- B. Renal failure
- C. Urolithiasis
- D. Nephritis

Answer: C. Urolithiasis

Explanation: Urolithiasis refers to stone formation in the urinary tract, mainly composed of calcium oxalate or phosphate.

Q44. The main excretory organ in humans is:

- A. Liver
- B. Kidney
- C. Skin
- D. Lungs

Answer: B. Kidney

Explanation: While other organs also eliminate some wastes, kidneys are the primary excretory organs responsible for nitrogenous waste removal.

Q45. Which of the following would lead to increase in GFR?

- A. Constriction of afferent arteriole
- B. Dilation of efferent arteriole
- C. Dilation of afferent arteriole
- D. Increase in glomerular capsule pressure

Answer: C. Dilation of afferent arteriole

Explanation: Dilation of the afferent arteriole increases blood flow into glomerulus, raising glomerular pressure and increasing GFR.