Biology 12 – Unit O – Human Biology
Urinary system: Excretory and Endocrine system

Chapter 16

A. Chapter Review

1. What does excretion do for the body and why is this important?

2. What are the 4 nitrogenous waste products that are excreted by the kidney?

3. How is ammonia formed? Urea is formed from what 2 molecules? What nitrogenous molecule will be excreted by many terrestrial animals? What happens when uric acid crystals collect in the joins?

4. What are bile pigments derived from? Trace the flow of bile. How does jaundice occur?

5. List 3 reasons why excretion of certain ions (salts) from the blood is important. What is the role of calcium, iron, and sodium ions?

6. How is carbon dioxide excreted? What fluid helps to determine blood pressure?

7. Name the organ of excretion that: A) Has sweat glands that aid in cooling the body. B) Excretes bile pigments that are stored in the gallbladder. C) Removes carbon dioxide and water. D) Excretes iron and calcium via defecation. E) Rids the body of urine. What pigment derived from heme is found in urine?

A)_____
B)_____
C)_____
D)_____
E)_____

8. List the organs of the urinary system and give their functions.

9. What are the 3 major regions of a kidney? What are the conical masses of tissue in the medulla called?

10. Name the microscopic unit of the kidney. How many of these units are there per kidney?

11. List the 5 parts of each nephron. Which parts are found in the cortex? In the pyramids?

12. What are the 2 capillary regions of each nephron called? Where are they found?

13. State the 3 steps that are involved in urine formation in the nephron.

14. Under the influence of glomerular blood pressure, _____ molecules move from the _____ to the inside of the _____. This is a pressure _____ process because _____ molecules and formed elements are unable to pass through. The _____ contains small dissolved molecules in approximately the same concentration as the _____.

15. What are the 2 factors that aid in the movement of water molecules by passive reabsorption?

16. Name the 2 anatomical features in the proximal convoluted tubule that contribute to active reabsorption and state why they are important.

17. Why is reabsorption by active transport said to be selective?

18. What happens when the blood glucose level goes beyond the maximal rate of transport, as in diabetes mellitus?

19. Define tubular excretion. Where does it occur? Is it an active or passive process? List 5 substances that are excreted.

20. Excretion of a hypertonic urine is dependent upon what 2 segments of the nephron?

21. Compare the movements of salt and water in the thick portion of the ascending limb of the loop of Henle.

22. Define the countercurrent mechanism. What does it ensure?

23. How does the collecting duct create urine that is hypertonic to blood plasma?

24. If the blood is acidic, what ions will be excreted and reabsorbed to restore the pH? If blood is basic?

25. Blood volume is primarily maintained by which hormone? Where is this hormone produced?

When ADH is present, more _____ is reabsorbed and a _____ amount of urine results.

26. How does alcohol cause diuresis? What are diuretics used for?

27. What hormone maintains sodium and potassium ion balance? Where and how does this hormone act?

28. Describe what happens if the blood pressure is insufficient to promote efficient filtration. What is the role of rennin? What does ACE inhibitor do?

29. Name the infection (or condition) if it occurs within the: Urethra? The bladder? The kidneys? With urea accumulation in the urine?

30. Which condition is of greatest concern: uremia or retention of water and salts? Why?

31. If a satisfactory donor cannot be found for a kidney transplant, what alternative treatments can be used?

_____

32. Define dialysis. Describe how hemodialysis is achieved.

_____
_____
_____

B. completion and short answer questions.

1. Urea is a waste product formed from _____ and _____ and is made in the _____ and excreted by the _____.

2. The large intestines excrete _____.

3. The outermost portion of the kidney is called the _____.

4. Fill in the missing parts of the nephron as fluid travels through the nephron: Bowman's capsule → _____ → loop of Henle → _____ → collecting tube.

5. Glucose reabsorption primarily occurs in the _____ portion of the nephron.

6. Name a substance that is filtered, maximally reabsorbed, and still in the urine. _____

7. Glucose is not normally found in the urine; it is usually totally reabsorbed by means of _____.

8. When ADH is present, there is increased _____ reabsorption but a decrease in _____ volume.

9. What substance(s) do these organs excrete?
a) sweat glands: _____
b) lungs: _____
c) liver: _____
d) kidneys: _____
e) large intestines: _____

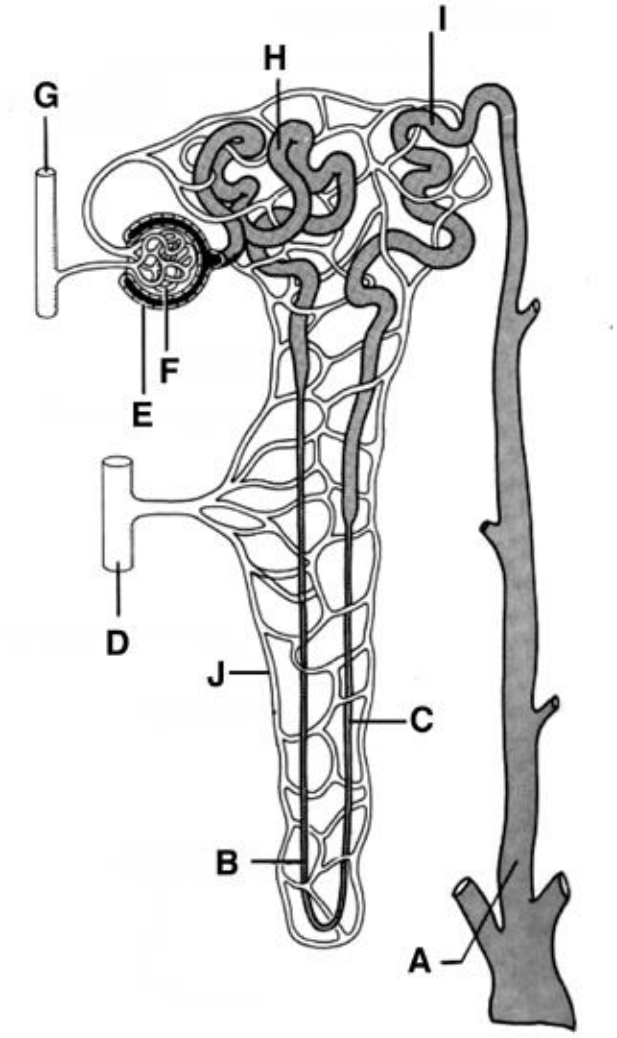
10. complete this table of nitrogenous waste products.

Nitrogenous Waste	Derived from
a. Urea	
b. Creatinine	
c. Uric acid	

11. List the organs of the urinary system in sequence according to the path taken by urine.
_____ → _____ → _____ → _____

12. Macroscopically, the kidney is composed of three parts: _____, _____, and the _____.

13. Label the important parts of the nephron in the diagram shown below.



A. _____
B. _____
C. _____
D. _____
E. _____
F. _____
G. _____
H. _____
I. _____
J. _____

14. The two capillary regions found in each nephron are the _____ and the _____ capillaries.

15. The patient's blood carries impurities as it enters the chamber of the artificial kidney. As it passes through the chamber of the artificial kidney, the impurities pass out of the blood. The blood then exits with no nitrogenous wastes left. What should be the makeup of the solution that enters the chamber of the artificial kidney? _____
_____

16. When the amino group (-NH) from an amino acid is removed, the process is termed _____

17. Filterable Blood Components: Nutrients (glucose, amino acids); nitrogenous wastes (urea, uric acid); ions (salts); water.
Nonfilterable Blood Components: Formed elements (RBC, WBC, etc.); proteins.

a) Which of these portions will enter into the Bowman's capsule and be called the filtrate? _____.

b) Which of the molecules in the filtrate will tend to be selectively reabsorbed? _____

c) Which of the molecules in the filtrate will tend to not be reabsorbed? _____

d) Name a substance that undergoes tubular excretion. _____

18. Explain why albumin is not normally found in the urine. _____
_____

19. The small capillary network within the confines of the Bowman's capsule is called the _____.

20. Place an x in the box opposite the component of blood if it is associated with the structure, process or substance listed vertically.

Components of blood	Afferent arteriole	Filtrate	Efferent arteriole	Reabsorption	Tubular excretion	Urine	Venous blood
Plasma proteins							
RBC							
WBC							
Glucose							
Amino acids							
Sodium chloride							
Water							
Urea							
Uric acid							
Penicillin							

21. The solution produced when blood is filtered through the walls of the glomerulus and the Bowman's capsule is called the _____.

22. The force that causes filtration to occur in the glomerulus is called the _____

Match the functions below with the following correct structure: a. glomerulus b. Bowman's capsule c. renal cortex d. loop of Henle e. collecting duct

23. _____ extends into the medulla
24. _____ a tuft of capillaries
25. _____ variably permeable to water
26. _____ region of afferent/efferent arterioles
27. _____ blind end of the proximal convoluted tubule

C. Multiple choice questions

28. In which of the following would you find urine?
a. uterus b. urethra c. intestine d. gallbladder e. hepatic portal vein

29. Pressure filtration should be associated with the
a. Bowman's capsule b. distal convoluted tubule c. proximal convoluted tubule
d. collecting duct e. loop of Henle

30. Glucose
a. is in the filtrate and urine b. is in the filtrate and not in the urine
c. undergoes tubular excretion and is in the urine d. Undergoes tubular excretion and is not in the urine

31. The collecting ducts are primarily found in the
a. cortex b. medulla c. pelvis d. afferent arteriole

32. Which of the following describes the contents of the renal vein that leaves the kidney?
a. low in O_2, low in urea b. high in CO_2, high in urea c. high in O_2, high in urea
d. low in CO_2,high in urea

33. Kidneys are organs of homeostasis because they
a. regulate the blood volume b. regulate the pH of the blood
c. help maintain the correct concentration of ions in the blood d. excrete nitrogenous wastes
e. All of the above are true

34. Sodium is removed from the kidney tubule by
a. passive reabsorption b. active reabsorption c. an attraction to Cl^-
d. tubular excretion

35. The region around the top of the loop of Henle has a(n)
a. very low solute concentration b. intermediate solute concentration
c. very high solute concentration d. very high water concentration

36. Which of the following is *not* a true statement?
a. People with kidney disease often have high blood pressure
b. Kidney failure involves damage to the glomeruli
c. Failure of the kidney to maintain proper body pH is more serious than uremia
d. sugar in the urine indicates kidney disease
e. protein in the urine indicates kidney disease

D. True (T) or false (F) Question
If you believe the statement to be false then rewrite the statement as a true one.

37. A person who lacks ADH has too much urine.
Answer _____ Restatement: _____
_____

38. Drinking alcohol causes diuresis because it increases ADH secretion.
Answer _____ Restatement: _____
_____

39. The hormone ADH is released from the adrenal cortex, whereas aldosterone is released from the posterior pituitary.
Answer _____ Restatement: _____
_____

40. The juxtaglomerular apparatus will release the hormone rennin whenever there is a decrease in the blood pressure.
Answer _____ Restatement: _____
_____

41. The upper portion of the ascending loop of Henle actively transports salt out but is impermeable to water.
Answer _____ Restatement: _____
_____

E. Subjective chapter test

42. In both defecation and excretion, waste products are eliminated from the body. What is the difference, then, between the two terms?

43. Explain the relationship between the structure and function of the proximal convoluted tubule.