1. In the above figure, which letter best represents filtration?  
   a) W  b) X  c) Y  d) Z

2. In the above figure, which letter best represents tubular excretion?  
   a) from the glomerulus to Bowman’s capsule  
   b) from tubule to plasma  
   c) from plasma to tubule  
   d) to pelvis and ureter

3. In the above figure, which letter best represents these molecules: urea, uric acid, glucose, salts, water?  
   a) X  b) W  c) Z  d) Y

4. In the above figure, which letter best represents these molecules: nitrogenous wastes, salts, water?  
   a) X  b) W  c) Z  d) Y

5. In the above figure, which letter best represents these molecules only: glucose, salts, formed elements, water?  
   a) Y  b) W  c) Z  d) X

6. The excretory system helps regulate:  
   a) water content of the body  
   b) blood volume of the body  
   c) pH of the blood  
   d) All of the above

7. Which of the following would be an indication of kidney failure?  
   a) urea in the urine  
   b) salts in the urine  
   c) uric acid in the urine  
   d) protein (albumin) in the urine  
   e) dilute urine

8. Urea is a waste product in the metabolism of:  
   a) fats  
   b) glucose  
   c) minerals  
   d) proteins  
   e) none of the above

9. Excretion primarily rids the body of:  
   a) excess fuels  
   b) undigested foods  
   c) minerals  
   d) substances that were involved in metabolism  
   e) all of the above

10. The concentration of protein in the blood is higher in post-glomerular blood as compared with that in arterial blood because:  
    a) protein is digested in Bowman’s capsule  
    b) the kidney manufactures protein  
    c) reabsorption of protein occurs  
    d) as water passes into the filtrate, the concentration of protein in the blood will go up  
    e) water is a small molecule

11. Which of the following statements about the glomerulus is incorrect?  
    a) arterial blood enters and arterial blood leaves  
    b) it is needed for filtration  
    c) blood pressure powers the filtration  
    d) all of the above are incorrect

12. Fluid Amount per 24 hour period (liters)  
    Blood through renal arteries 600  
    Filtrate 100  
    Urine 1.5  
    Based on the table above, you may conclude that  
    a) each person secretes a lot of urine  
    b) humans excrete a hypertonic (concentrated) urine  
    c) water loss by kidneys is an evolutionary mistake  
    d) urine is 98% water

13. Glucose is found in renal tubule filtrate but not in urine because:  
    a) the kidney stores glucose as glycogen  
    b) kidney cells require glucose because energy is needed for active transport  
    c) glucose is “carried” back into the bloodstream by active transport  
    d) glucose is converted to amino acids in the kidney  
    e) glucose is dissolved in the urine

14. The microscopic anatomical unit of excretion found in the kidney is the:  
    a) nephron  
    b) Bowman’s capsule  
    c) glomerulus  
    d) Malpighian corpuscle  
    e) cortex
A 15. Normally, concentrations of metabolically important substances such as glucose are
   a) high in glomerular filtrate but only a trace in urine  b) low in glomerular filtrate but high in urine
   c) high in glomerular filtrate and urine  d) low in both glomerular filtrate and urine

C 16. The loop of Henle a) serves no useful purpose  b) contains the glomerulus  c) is necessary for
   water reabsorption  d) creates a hypotonic urine

B 17. Urea is concentrated in the urine due to  a) the process of tubular excretion  b) the reabsorption
   of water  c) the conversion of uric acid to urea  d) deamination of protein by kidney cells

B 18. Which of these facts is best associated with active transport?  a) proteins are too large to be in the
   filtrate  b) glucose is reabsorbed 100%  c) nephritis is a bacterial infection  d) amino acids are
   small enough to be in the filtrate  e) all of the above are true

E 19. The collecting ducts  a) are found within both the cortex and medulla  b) contain urine  c) are a part
   of the nephron  d) empty into the pelvis  e) all of the above are true

D 20. The graph above shows the percentages of H2O in the filtrate within various structures of the nephron. Which structure is likely the collecting duct?
   a) Z  b) X  c) W  d) Y

D 21. The urethra connects the urinary bladder to the
   a) kidney  b) liver  c) pancreas  d) none of the above are true

B 22. The vital role in deamination and formation of urea occurs in the a) kidney  b) liver  c) pancreas  d) pituitary

C 23. Which of the following is a valid comparison between the composition of plasma and urine?  a) In
   plasma, the insulin concentration is lower, while in urine it is higher.  b) In plasma, the glucose
   concentration is lower, while in urine it is higher.  c) In plasma, the metabolic waste concentration
   is lower, while in urine it is higher.  d) In plasma, the carbon dioxide concentration is lower, while in
   urine it is higher.

C 24. Reabsorption occurs where in the nephron? a) glomerulus  b) afferent arteriole  c) capillary net
   about the tubule  d) renal vein

B 25. The liquid that collects in the cavity of Bowman's capsule is  a) concentrated urine  b) blood
   plasma minus blood protein  c) used bile ready for excretion  d) glycogen and water

C 26. Which of the following groups of organs all function in excretion? a) lungs, pancreas, skin, large
   intestine, liver, kidneys  b) kidneys, heart, lungs, skin, nose, spleen  c) large intestine, lungs, liver, skin, kidneys  d) eyes, nose, mouth, kidneys, liver, pancreas

B 27. An increased amount of ADH leads to
   a) an increased amount of urine  b) a decreased amount of urine  c) no change in the amount of
   urine  d) kidney failure

C 28. If the blood is alkaline  a) more hydrogen ions and more sodium and bicarbonate ions are excreted
   b) less hydrogen ions and more sodium and bicarbonate ions are reabsorbed  c) less hydrogen ions are excreted and less sodium ions are reabsorbed  d) the kidneys reabsorbed increased amounts of water

C 29. Penicillin leaves the blood plasma through tubular walls and not through the glomerulus. Therefore, penicillin is removed from the blood by the process of
   a) osmosis  b) filtration  c) tubular excretion  d) diffusion  e) both a and d are true

B 30. The physical principle upon which kidney dialysis is based is
   a) active transport  b) diffusion  c) heat transfer  d) hydrogen ion transfer
31. Aldosterone is a) released by the kidneys and causes an increase in blood volume b) is released by the adrenal glands and causes the kidneys to retain sodium and excrete potassium ions c) is released by the pituitary and causes less urination d) is produced by the hypothalamus and causes the kidneys to retain potassium and excrete sodium ions.

32. Which capillaries are enclosed by Bowman’s Capsule? a) Glomerular b) distal c) peritubular d) proximal.

33. Which substance would normally be found in higher concentration in urine than in blood? a) Protein b) Urea c) Oxygen d) Glucose.

34. Which of these is NOT an organ of excretion? a) skin b) liver c) lungs d) pancreas.

35. In the kidney, increased glomerular filtration is caused by a) high blood pressure b) decreased blood volume c) dilation of the efferent arteriole d) stimulation of the parasympathetic nervous system.

36. Cells were removed from a part of a kidney nephron and the following characteristics were observed i) NUMEROUS MITOCHONDRIA ii) EXTENSIVE MICROVILLI In which structure are these cells located? a) glomerulus b) collecting duct c) Bowman’s capsule d) Proximal convoluted tubule.

37. If the collecting duct did not pass through the middle of the kidney (medulla) before reaching the ureter, which of the following would most likely occur? a) blood volume would increase b) the urine would be hypotonic to the blood plasma c) ADH could not act on the walls of the collecting duct d) the urine would be more concentrated than the blood plasma.

38. In the diagram below, which of the following should be found in structure Y, but not in X?

- A. Urea.
- B. Water.
- C. Glucose.
- D. Formed elements.

39. If the sodium level in the blood below normal, this will result in the release of a) ADH b) ACTH c) cortisol d) aldosterone.

40. Alcohol a) increases ADH secretion b) inhibits ADH c) increase aldosterone secretion d) inhibits aldosterone.

41. In order for the urine to be more concentrated than plasma, the tissues surrounding the loop of Henle and collecting duct must be a) isotonic b) hypotonic c) hypertonic d) high in water concentration.
Plasma was analyzed from a student before and after a 50 km bicycle race and the results appear above.
An increase in which of the following will help return plasma concentrations to normal levels?  a) Aldosterone  b) ADH  c) gastrin  d) insulin

Movement of fluids from the glomerulus to Bowman's capsule is due to  a) osmosis  b) secretion  c) active transport  d) pressure filtration

Which of the following would be released by the posterior pituitary when blood pressure drops?  a) adrenalin  b) aldosterone  c) acetylcholine  d) antidiuretic hormone

Which of the following would be true of both the blood and urine of a healthy person?  a) urine and blood contain bile  b) urine and blood contain the same concentration of urea  c) blood contains amino acids, urine usually contains none  d) urine contains protein molecules, blood usually contains none.

Where are histamine, penicillin, hydrogen ions, and ammonia removed from the blood?  a) loop of Henle  b) collecting duct  c) proximal tubule  d) distal tubule  e) Bowman's capsule

Which of the following gives the correct order of urine formation?  a) 1, 3, 4, 2  b) 2, 4, 1, 3  c) 3, 2, 1, 4  d) 3, 4, 1, 2

Which structure is not matched correctly with its function?  a) Bowman's capsule - pressure filtration  b) ureter - transport urine from kidney to bladder  c) proximal tubule - variable permeability to water  d) afferent arteriole - brings blood under high pressure to the glomerulus

Which of the following corresponds to the structure whose function is to store urine?  a) W  b) Z  c) Y  d) X

If the blood becomes acidic, the kidneys will maintain homeostasis by actively excreting  a) penicillin  b) histamine  c) calcium ions  d) hydrogen ions