Anatomy and Physiology

Names	
High School	
Team Number	

Directions: The following examination contains a series of true/false, short answer and multiple-choice questions. You will have 50 minutes to complete the test, which is valued at 352 points. Selected questions, which are clearly identified, will serve as tiebreakers. Answer all questions using the provided answer sheet. Only responses recorded on the answer sheet will be graded.

Section I: Respiratory System (127 pts)

Directions: For questions 1-12, determine if each of the statements below is true or false. Spell out your answer selection. (24 pts; 2 pts each)

1. There is an increase in the amount of cartilage and a decrease in the amount of smooth muscle in the lower respiratory passageways. With increased cartilaginous support, the amount of tension in the smooth muscles has a greater effect on bronchial diameter and the resistance to air flow.

2. You cannot swallow food while talking because during talking the airways are open and the food passages are closed.

3. Breathing through the nasal cavity is less desirable than breathing through the mouth because the mouth is designed to cleanse, moisten, and warm inhaled air, while the nasal cavity is not.

4. Septal cells are not involved in keeping the alveoli from collapsing.

5. Alveolar ventilation is air movement into and out of the alveoli. This process prevents the buildup of carbon dioxide in the alveoli and ensures a continuous supply of oxygen that exceeds pace of absorption by the bloodstream.

6. Henry's Law states that at a given pressure, the amount of a particular gas that dissolves in a liquid is inversely proportional to the partial pressure of the gas.

7. If the pleural cavity is penetrated due to an injury, the lung will collapse.

8. When a person sneezes, the process of respiration temporarily ceases. However, when a person coughs, the process of respiration does not cease.

9. The Bohr Effect describes the effect of pH on the saturation of hemoglobin.

10. The ventral respiratory group functions in every respiratory cycle while the dorsal respiratory group functions only during forced expiration.

11. A decrease in blood pressure triggers a baroreceptor reflex that leads to decreased ventilation. This decrease in ventilation will increase the movement of venous blood back to the heart, which helps raise the blood pressure.

12. Jill has chronic advanced emphysema for 15 years. While hospitalized with a respiratory infection, she goes into respiratory distress. Providing pure oxygen to Jill will restore her breathing.

13. Describe the four functions of the human respiratory system. (4 pts)

14. Identify the disorder or disease associated with the following symptoms. (10 pts)

A. Deficiency of oxygen in a tissue or the inability to use oxygen

B. Malignancy of pulmonary tissue

C. Allergens trigger release of histamine and other inflammatory chemicals that cause intense bronchoconstriction

D. Cessation of breathing for 10 seconds or longer during sleep

E. Inflammation of the vocal chords

F. An inherited disorder that causes thick, sticky mucus to build up in the lungs

G. Excess fluids in the lungs

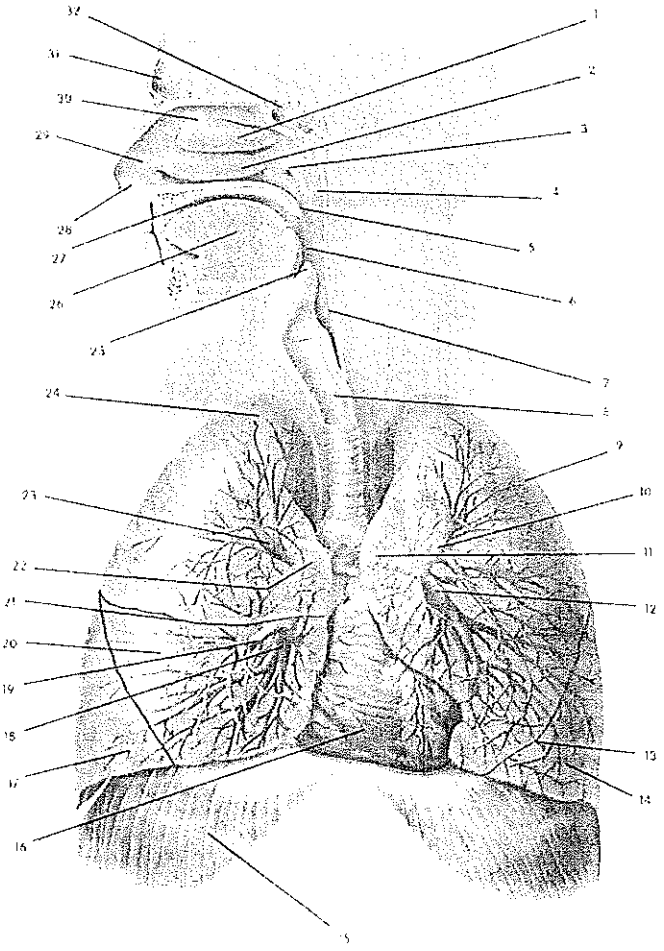
H. Alveolar walls break down and the surface of the lungs are reduced

I. Inflammation of the pleural lining surrounding the lungs

J. Excess oxygen causing the buildup of peroxides and free radicals

15. List and describe the four main processes of the respiratory system. (4 pts)

16. Label each of the anatomical features of the respiratory system. Number 17-24 are tie-breakers. (32 pts)



17. Identify the term for the following patterns of breathing (5 pts):

A. Labored, gasping breathing shortness of breath

B. Temporary cessation of breathing

C. Normal, relaxed, quiet breathing

D. Increased rate and depth of breathing in response to exercise or pain

E. Accelerated respiration

Direction: Select the correct answer from the four choices presented. (28 pts; 2 pts each)

18. Control over the amount of resistance to airflow and the distribution of air in the lungs is provided by the
(A) diaphragm
(B) trachea
(C) bronchioles
(D) alveoli

19. The presence of an abnormally low carbon dioxide content in blood is
(A) hypocapnia
(B) anoxia
(C) hypoxia
(D) hypercapnia

20. During a normal inhalation, the intrapleural pressure is approximately,
(A) – 1 mm Hg
(B) + 6 mm Hg
(C) + 1 mm Hg
(D) – 6 mm Hg

21. In tissues at a normal partial pressure of oxygen, blood entering the venous system contains about _____ of its total oxygen content.
(A) 25 percent
(B) 50 percent
(C) 75 percent
(D) 90 percent

22. Approximately 70 percent of the carbon dioxide absorbed by blood is transported
(A) as carbonic acid
(B) bound to hemoglobin
(C) in the form of dissolved gas molecules
(D) bound to oxygen molecules

23. The apneustic centers of the pons
(A) Inhibit the pneumotaxic and inspiratory centers
(B) provide continuous stimulation to the inspiratory center
(C) monitor blood gas levels
(D) alter chemoreceptor sensitivity

24. All of the following provide chemoreceptor input to the respiratory centers of the medulla oblongata, except the
(A) olfactory epithelium
(B) medullary chemoreceptors
(C) aortic body
(D) carotid body

25. Sympathetic stimulation of the smooth muscle tissue layer in the bronchioles causes
(A) bronchoconstriction
(B) bronchodilation
(C) a relaxation of muscle tone
(D) an increase in tidal volume

26. If you have a respiration rate of 15 breaths per minute and a tidal volume of 500 mL of air, your respiratory minute volume is
(A) 7.5 L/min
(B) 75 L/min
(C) 750 L/min
(D) 7500 L/min

27. If an inhalation in one respiratory cycle pulls in 1000 mL of air, the amount of air reaching the alveolar spaces is about
(A) 300 mL
(B) 850 mL
(C) 150 mL
(D) 700 mL

28. Gas exchange at the respiratory membrane is efficient because
(A) the differences in partial pressure is substantial
(B) the gases are lipid soluble
(C) the total surface area is large
(D) a, b, c, are correct

29. For any partial pressure of oxygen, if the concentration of 2,3-bisphophoglycerate increases,
(A) the amount of oxygen released by hemoglobin will decrease
(B) the oxygen levels in hemoglobin will be unaffected
(C) the amount of oxygen released by hemoglobin will increase
(D) the amount of carbon dioxide carried by hemoglobin will increase

30. The primary physiological adjustment necessary for an athlete to compete at high altitudes is
(A) an increased respiratory rate
(B) an increased heart rate
(C) an elevated hematocrit
(D) a, b, and c are correct

31. An increase in the partial pressure of carbon dioxide in arterial blood causes chemoreceptors to stimulate the respiratory centers, resulting in
(A) a decreased respiratory rate
(B) an increased respiratory rate
(C) hypocapnia
(D) hypercapnia

32. Jill has an obstruction of her right primary bronchus. As a result, how would you expect the oxygen-hemoglobin saturation curve for her right lung to compare with that of her left? (10 pts; Tie-Breaker Question)

33. Jack spends that night at a friend's house during the winter. Jack's friend's home is quite old, and the hot-air furnace lacks a humidifier. When Jack wakes up in the morning, he has a fair amount of nasal congestion and decides he might be coming down with a cold. After a steamy shower and some juice for breakfast, the nasal congestion clears. Explain. (10 pts; Tie-Breaker Question)

Section II – Digestive System (132 pts)

Directions: For questions 1-20, determine if each of the statements below is true or false. Do NOT write T or F, spell out your answer. (40 pts; 2 pts each)

1. Parasympathetic stimulation promotes secretion of small amounts of very thick saliva while sympathetic innervation accelerates saliva secretion.

2. The bicuspids are important for crushing, mashing, and slashing.

3. The pharyngeal constrictors push the bolus toward the esophagus.

4. Swallowing is controlled by the swallowing center of the medulla oblongata via only the trigeminal nerve.

5. Parietal cells secrete intrinsic factor which facilities the absorption of vitamin B_{12} across the intestinal lining.

6. Only the duodenum and jejunum, which are two subdivisions of the small intestine, are involved in the digestion and absorption of food.

7. The pancreas provides digestive enzymes as well as buffers that assist in the neutralization of chyme.

8. Enterocrinin is a hormone produced by duodenal enteroendrocrine cells that stimulates the submucosal glands of the duodenum.

9. The sacral parasympathetic system which is activated by stretch receptors stimulates peristalsis via motor commands distributed by the pelvic nerves.

10. An orthodontic surgeon needs to only drill through the dentin to perform a removal of the alveolar nerve in a severely damaged tooth.

11. The longitudinal folds of the epithelium of the digestive tract greatly increase the surface area for absorption.

12. During a peristaltic movement, the circular muscles churn and fragment the digestive material.

13. Both neural and hormonal controls influence the times and rates of acid secretion, which protects the epithelium of the stomach from digestion.

14. Aspirin is basic, which aggravates stomach ulcers by reacting with stomach acids.

15. After a heavy meal, bicarbonate ions pass from parietal cells of the stomach into the extracellular fluid, causing the pH of the extracellular fluid to lower.

16. Inflamed tissue in the small intestine as a result of Crohn's Disease will absorb nutrients better due to the increase in surface area.

17. Gallstones cannot pass through the common bile duct.

18. Chief cells secrete gastrin, an inactive proenzyme that is converted by the acid in the lumen to its active form.

19. The gastric phase, which is directed by the CNS, beings with the sight or thought of food.

20. The intestinal phase controls the rate of gastric emptying and ensures that the secretory, digestive, and absorptive functions of the small intestine can proceed at reasonable efficiency.

21. What are the six steps involved in digestion? (6 pts)

22. Name the layers of the digestive tract, proceeding from the innermost to outermost layer. (5 pts)

23. List the three pairs of salivary glands. (3 pts)

Direction: Select the correct answer from the four choices presented. (42 pts; 2 pts each)

24. The enzymatic breakdown of large molecules into their basic building block is called
    (A) absorption
    (B) secretion
    (C) mechanical digestion
    (D) chemical digestion

25. The muscularis externa propels materials from one portion of the digestive tract to another by the contractions of
    (A) segmentation
    (B) propulsion
    (C) mass movement
    (D) peristalsis

26. The activities of the digestive system are regulated by
    (A) hormonal mechanism
    (B) local mechanisms
    (C) neural mechanisms
    (D) a, b, and c are correct

27. Double sheets of peritoneum that provide support and stability for the organs of the peritoneal cavity are the
(A) mediastina
(B) mucous membranes
(C) omenta
(D) mesenteries

28. The peritoneal fold that stabilizes and supports the small intestine is the
(A) serosa
(B) less omentum
(C) mesentery proper
(D) parietal peritoneum

29. Intrinsic factor and hydrochloric acid are secreted by cells in the stomach wall called
(A) parietal cells
(B) chief cells
(C) acinar cells
(D) G cells

30. Protein degradation in the stomach results primarily from secretions released by
(A) G cells
(B) parietal cells
(C) chief cells
(D) D cells

31. The part of the digestive tract that plays the primary role in the digestion and absorption of nutrients is, or are,
(A) large intestine
(B) small intestine
(C) stomach
(D) cecum and colon

32. The hormone that stimulates the secretion of the stomach and contraction of the stomach walls is
(A) gastin
(B) enterokinase
(C) secretin
(D) cholecystokinin

33. Bile release from the gallbladder into the duodenum occurs only under the stimulation of
(A) cholecystokinin
(B) secretin
(C) gastrin
(D) enterokinase

34. The major function(s) of the large intestine is (are) the
(A) reabsorption of water and compaction of feces
(B) absorption of vitamins liberated by bacterial action
(C) storage of fecal material prior to defecation
(D) a, b, and c are correct

35. The part of colon that accepts chyme from the small intestine is the
    (A) sigmoid colon
    (B) transverse colon
    (C) descending colon
    (D) ascending colon

36. The three longitudinal bands of smooth muscle found on the other surface of the colon are
    (A) fatty appendages
    (B) haustra
    (C) colic flexures
    (D) taeniae coli

37. Three vitamins generated by bacteria in the colon are
    (A) vitamins A, D, and E
    (B) B complex vitamins and vitamin C
    (C) vitamin K, biotin, and pantothenic acid
    (D) niacin, thiamine, and riboflavin

38. The final enzymatic steps in the digestive process are accomplished by
    (A) brush border enzymes of the microvilli
    (B) enzymes secreted by the stomach
    (C) enzymes secreted by the pancreas
    (D) the action of bile from the gallbladder

39. If the lingual frenulum is too restrictive, an individual
    (A) has difficulty tasting food
    (B) cannot swallow properly
    (C) cannot control movements of the tongue
    (D) cannot eat or speak normally

40. Increased secretion by all the salivary glands results from
    (A) sympathetic stimulation
    (B) hormonal stimulation
    (C) parasympathetic stimulation
    (D) myenteric reflexes

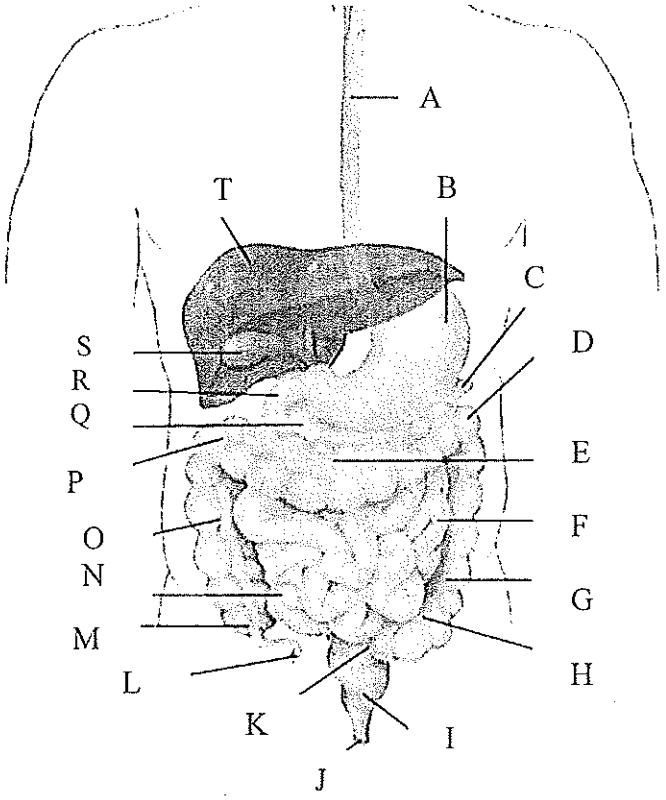
41. The production of acid and enzymes by the gastric mucosa is controlled and regulated by
    (A) the central nervous system
    (B) short reflexes coordinated in the stomach wall
    (C) digestive tract hormones
    (D) a, b, and c are correct

42. During the gastric phase of secretion, the pH of the gastric contents
    (A) decreases continually
    (B) remains the same as the contents become diluted
    (C) increases immediately and remains higher than pH 2.0
    (D) increases slowly with controlled mixing

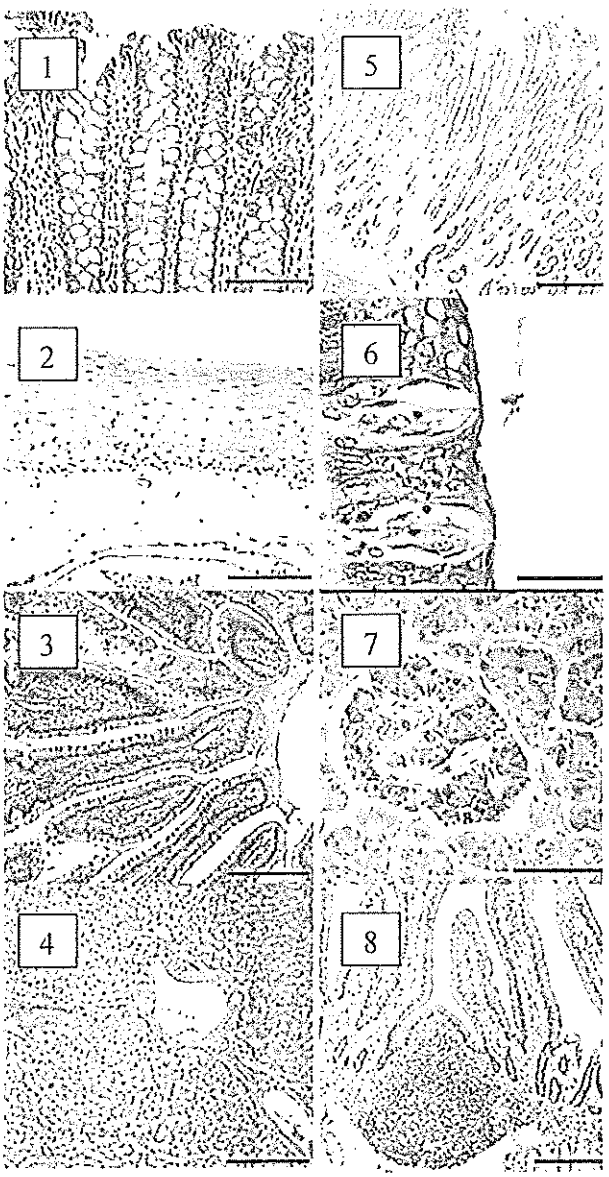
43. Chyme reaches the small intestine most quickly when
    (A) the stomach is greatly distended
    (B) a large amount of gastrin is released
    (C) the meal contains a relatively small quantity of proteins
    (D) a and c are correct

44. A drop in pH below 4.5 in the duodenum stimulates the secretion of
    (A) secretin
    (B) cholecystokinin
    (C) gastrin
    (D) a, b, and c are correct

45. Identify the following organs of the digestive system. (20 points)



46. Identify the source of the following tissues. (16 pts; Tie-Breaker Question)



Section III: Excretory System (93 pts)

1. List the four functions of the human excretory system. (4 pts)

2. List and describe the three functions of the human kidney. (3 pts)

3. What does the term GFR stand for, what does it define, and what is the normal human daily GFR? (3 pts)

4. A person experiencing kidney failure would have a GFR below what threshold as reported in mL/min? (2 pts)

5. Provide the name of the disease that most closely matches the descriptions below. (5 pts)

(A) Disorders that affect kidney function by attacking the glomeruli

(B) Enlarged prostate gland

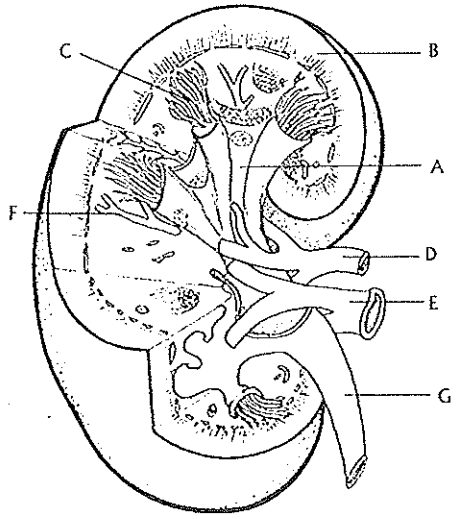
(C) Flow of urine is blocked causing it to back up and injure one or both kidneys

(D) Partial or complete failure of kidneys to function

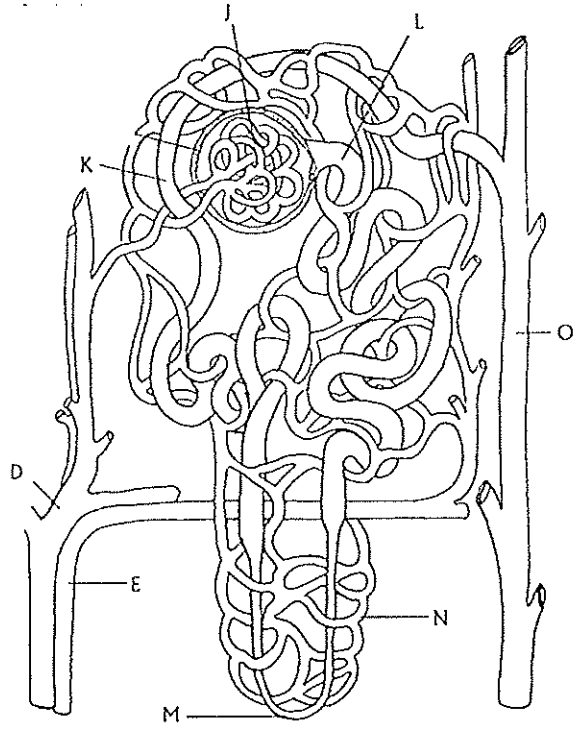
(E) Swelling and inflammation of the prostate gland

6. Identify A, B, and C in a cross-section of the human urethra. (6 pts; Tie-Breaker Question)

7. Label the features of the human kidney. (7 pts)



8. Identify the features of the nephron. (7 pts)



Direction: Select the correct answer from the four choices presented. (40 pts; 2 pts each)

9. The layer of collagen fibers covering the outer surface of the entire kidney is the
   (A) adipose capsule
   (B) renal cortex
   (C) renal capsule
   (D) renal fascia

10. The glomerulus is located within the
    (A) renal corpuscle
    (B) renal tubule
    (C) renal pelvis
    (D) renal column

11. The capillaries supplying individual nephrons are themselves supplied with blood by the
    (A) afferent arterioles
    (B) efferent arterioles
    (C) peritubular capillaries
    (D) arcuate veins

12. Large cells with complex processes, of "feet" that wrap around the glomerular capillaries are
    (A) vasa recta
    (B) podocytes
    (C) astrocytes
    (D) supporting cells

13. The majority of nephrons are located in the _____ of the kidney.
    (A) vasa recta
    (B) medulla
    (C) cortex
    (D) pelvis

14. The distal convoluted tubule is an important site for
    (A) active secretion of ions
    (B) active secretion of acids and other materials
    (C) selective reabsorption of sodium ions from the tubular fluid
    (D) a, b, and c are correct

15. The endocrine structure that secretes rennin and erythropoietin is
    (A) the juxtaglomerular apparatus
    (B) the vasa recta
    (C) Bowman's capsule
    (D) the adrenal gland

16. The primary purpose of the collecting system is to
    (A) transport urine from the urinary bladder to the urethra
    (B) selectively reabsorb sodium ions from tubular fluid
    (C) transport urine from then renal pelvis to the ureters
    (D) make final adjustments to the osmotic concentration and volume of urine

17. Pickup or delivery of substances that are reabsorbed or secreted by the PCT and DCT is provided by the
    (A) afferent arteriole
    (B) peritubular capillaries
    (C) renal artery
    (D) efferent arteriole

18. The most abundant organic waste in urine is
    (A) uric acid
    (B) creatinine
    (C) urea
    (D) creatine phosphate

19. The removal of water and solute molecules from filtrate after it enters the renal tubules is
    (A) filtration
    (B) secretion
    (C) reabsorption
    (D) elimination

20. Blood colloid osmotic pressure tends to draw water
    (A) into Bowman's capsule
    (B) out of the filtrate and into the plasma
    (C) across the loop of Henle
    (D) out of the plasma at the Glomerulus

21. Which of the following is not a part of the filtration apparatus?
    (A) lamina densa
    (B) parietal epithelium
    (C) capillary endothelium
    (D) filtration slits

22. The urinary system regulates blood volume and pressure by
    (A) adjusting the volume the water lost in urine
    (B) releasing erythropoietin
    (C) releasing rennin
    (D) a, b, c, are correct

23. The balance of solute and water reabsorption in the medulla is maintained by the
    (A) segmental arterioles and veins
    (B) interlobar arteries and veins
    (C) vasa recta
    (D) arcuate arteries

24. Sympathetic activation of the nerve fibers in the nephron causes
    (A) the regulation of glomerular blood flow and pressure
    (B) the stimulation of rennin release from the juxtaglomerular apparatus
    (C) the direct stimulation of water and Na^+ reabsorption
    (D) a, b, and c are correct

25. An increase in the colloid osmotic pressure of the filtrate, caused by damage to the glomerulus, would
    (A) decrease the amount of plasma delivered to the kidney
    (B) enhance the movement of water and solutes into the capsular space
    (C) causes a decrease in the renal blood pressure
    (D) decreases movement of water and solutes into the capsular space

26. Sodium reabsorption in the DCT and cortical portion of the collecting system is accelerated by the secretion of
    (A) ADH
    (B) rennin
    (C) aldosterone
    (D) erythropoietin

27. When ADH levels rise,
    (A) the amount of water absorbed increases
    (B) the DCT becomes impermeable to water
    (C) the amount of water reabsorbed decreases
    (D) sodium ions are exchanged for potassium ions

28. The control of blood pH by the kidneys during acidosis involves
    (A) the secretion of hydrogen ions and reabsorption of bicarbonate ions from tubular fluid
    (B) a decrease in the amount of water reabsorbed
    (C) hydrogen ion reabsorption and bicarbonate ion loss
    (D) potassium ion secretion

29. What two functions does the countercurrent mechanism perform for the kidney? (4 pts)

30. The drug Diamox is sometimes used in the treatment of mountain sickness. Diamox inhibits the action of carbonic anhydrase in the proximal convoluted tubule. Polyuria is a side effect associated with the medication. Why does this symptom occur? (4 pts; Tie-Breaker Question)

31. Mannitol is a sugar that is filtered, but not reabsorbed, by the kidney. What effect would drinking a solution of mannitol have on the volume of urine produced? (4 pts; Tie-Breaker Question)

32. Jack enjoys four or five cups of coffee a day and has six or seven beers a few nights a week. What are the effects of his caffeine and alcohol consumption on his urinary system? (4 pts; Tie Breaker Question)

Section I: Respiratory System (127 pts)

Directions: For questions 1-12, determine if each of the statements below is true or false. Do NOT write T or F, spell out your answer. (2 pts each for a total of 24 pts)

1. False

2. True

3. False

4. False

5. False

6. False

7. True

8. False

9. True

10. False

11. False

12. False

13. 1 pt for each correct

(A) Provides oxygen to the blood stream and removes carbon dioxide
(B) Enables sound production or vocalization as expired air passes over the vocal chords
(C) Enables protective and reflexive non-breathing air movements
(D) Control of acid-base balance and control of blood pH

14. Identify the disorder or disease associated with the following symptoms. (10 points)

A. Hypoxia
B. Lung Cancer
C. Asthma
D. Sleep apnea
E. Laryngitis
F. Cystic fibrosis
G. (Pulmonary) Edema
H. Emphysema
I. Pleurisy
J. oxygen toxicity

15. 0.5 pt for each and 0.5 pt for each description

(A) Pulmonary ventilation: movement of air into the lungs and movement of air out of the lungs

(B) External respiration: movement of oxygen from the lungs to the blood and movement of carbon dioxide from the blood to the lungs

(C) Transport of respiratory gases: transport of oxygen from the lungs to the tissues and transport of carbon dioxide from the tissues to the lungs.

(D) Internal respiration: movement of oxygen from blood to the tissue cells and movement of carbon dioxide from tissue cells to blood

16. Label each of the anatomical features of the respiratory system. (32 pts) (#17-24: tie-breakers)

1. Middle nasal concha
2. Inferior nasal concha
3. Opening of eustachian tube
4. Nasopharynx
5. Soft palate
6. Oropharynx
7. Esophagus
8. Trachea
9. Superior lobe of l. lung
10. L. superior lobar bronchus
11. L. main bronchus
12. L. inferior lobar bronchus
13. Oblique fissure
14. Inferior lobe of l. lung
15. Diaphragm
16. Heart
17. Inferior lobe of r. lung
18. R. inferior lobar bronchus
19. R. middle lobar bronchus
20. Middle lobe of r. lung
21. Horizontal fissure of r. lung
22. R. main bronchus
23. R. superior lobar bronchus
24. Apex of lung
25. Epiglottis
26. Tongue
27. Oral cavity
28. Vestibule of nose
29. Nasal cavity
30. Superior nasal concha
31. Frontal sinus
32. Sphenoid sinus

17. Identify the term for the following patterns of breathing (5 pts):
    A. Dyspnea
    B. Apnea
    C. Eupnea
    D. Hypernea
    E. Tachypnea

18. C
19. A
20. D
21. C
22. A
23. A
24. A
25. B
26. A
27. D
28. D
29. C
30. C or D
31. B

32. The oxygen-hemoglobin saturation curve would shift the oxygen-hemoglobin saturation curve to the left (the Bohr effect) for the right lung, compared with that for the left lung.

8 pts for determining the shift of the curve; 2 pts for mentioning the Bohr effect

33. While sleeping, Jack was breathing air that was so dry that it absorbed more than the normal amount of moisture as it passed through the nasal cavity. The loss of moisture made the mucous secretions viscous and harder for the cilia to move. The nasal epithelia continued to secrete mucus but little of it moved resulting in nasal congestion. After the shower and juice, more moisture was transferred to the mucus loosening it and eliminating the problem.

5 pts for loss of moisture; 2 pts for difficulty for cilia to move; 2 pts for continual secretion of mucus; 1 pts for loosening mucus

Section II – Digestive System (132 pts)

Directions: For questions 1-20, determine if each of the statements below is true or false. Do NOT write T or F, spell out your answer. (40 pts)

1. False
2. False
3. True
4. False
5. True
6. False
7. True
8. True
9. True
10. False
11. True
12. False
13. True
14. False
15. False
16. False
17. False
18. False
19. False
20. True

21. 1 pt for each

(1) Ingestion
(2) Mechanical processing
(3) Secretion
(4) Digestion
(5) Absorption
(6) Secretion

22. 1 pts for each, 1 pt for listing four layers
Mucosa, submucosa, muscularis externa, and serosa

23. 1 pt each
Parotid salivary glands, sublingual salivary glands, and submandibular salivary gland

24. D
25. D
26. D
27. D
28. C
29. A
30. C
31. B
32. A
33. A
34. D
35. D
36. D
37. C
38. A
39. D
40. C
41. D
42. D
43. D
44. A

45. 1 pt each
(A) Esophagus
(B) Stomach
(C) Spleen
(D) Splenic flexura of transverse colon
(E) Transverse colon
(F) Jejunum
(G) Descending colon
(H) Sigmoid colon
(I) Rectum
(J) Anus
(K) Sigmoid fixture
(L) Appendix
(M) Cecum
(N) Illeum
(O) Ascending colon
(P) Hepatic flexure
(Q) Pancreas
(R) Duodenum
(S) Gallbladder
(T) Liver

46. Identify the source of the following tissues. (16 pts, 2 pts each; Tie-Breaker)

(1) Large Intestine
(2) Lip
(3) Small Intestine
(4) Liver
(5) Stomach
(6) Taste Buds
(7) Pancreas
(8) Small Intestine

Section III: Excretory System (93 pts)

1. 1 point for each function

(A) Excrete toxins and nitrogenous waste
(B) Regulate levels of many chemicals in blood
(C) Maintain water balance
(D) Help regulate blood pressure

2. (0.5 pts for each function and 0.5 pts for each description)

(A) Filtration – fluid pressure forces water and dissolved substances out of blood
(B) Reabsorption – returns useful items such as blood cells, plasma protein, glucose, amino acids, and some salts and some water to the blood.
(C) Secretion – removes residues from toxins, drugs, more urea, and uric acid into urine, excess potassium ions, and regulates pH of blood

3. GFR abbreviates glomerular filtration rate, it defines the amount of filtrate formed per minute in all nephrons of both kidneys, and the normal GFR is 180 L/day.

1 pt for term; 1 pt for definition; 1 pt for normal GFR

4. A GFR of below 15 mL/min indicates kidney failure.

5. 1 pts each

(A) glomerular disorders
(B) benign prostyatic hypertrophy
(C) urinary tract infection
(D) renal failure
(E) prostatitis

6. 2 pts each

A. Muscular wall
B. Lumen
C. Transitional Epithelium

7. 1 pt each

(A) Renal pelvis
(B) Cortex
(C) Medula
(D) Renal Artery
(E) Renal vein
(F) Nephron
(G) Ureter

8. 1 pt each

(D) Renal Artery
(J) Glomerulus
(M) Loop of Henle
(N) Capillaries

(K) Distal Tubule (O) Collecting Duct
(L) Proximal Tubule or Bowman's capsule

Each of the following multiple choice questions are worth 2 points.

9. C
10. A
11. B
12. B
13. C
14. D
15. A
16. D
17. B
18. C
19. C
20. B
21. B
22. D
23. C
24. D
25. B
26. C
27. A
28. A

29. (1) It is an efficient way to reabsorb solutes and water before the tubular fluid reaches the DCT and collecting system; and (2) its establishes a concentration gradient that will permit the passive reabsorption of water from urine in the collecting system.

30. Carbonic anhydrase catalyzes the reaction that forms carbonic acid, a source of hydrogen ions that are excreted by the kidneys. Hydrogen ion excretion is accomplished by an antiport system in which sodium ions are exchanged for hydrogen ions. Fewer hydrogen ions would be available, so less sodium would be reabsorbed, contributing to an increased osmolarity of the filtrate. In turn, an increased volume of urine and more-frequent urination would result.

31. Because mannitol is filtered but not reabsorbed, drinking a mannitol solution would lead to an increase in the osmolarity of the filtrate. Less water would be reabsorbed, an increased volume of urine would be produced.

32. Caffeine increases the glomerular filtration rate by increasing blood flow into glomerular capillaries. The increase in filtrate formation and in the rate of flow through the renal tubule reduces the time available for the reabsorption of solutes. The alcohol acts as a diuretic, inhibiting ADH secretion and resulting in excess loss of water by the formation of dilute urine. The resulting dehydration leads to decreased secretion by body glands, including the salivary glands, which makes the mouth dry.