CTAS A&P II (BI 302) Self-Assessment Practice Questions

Dr. David J. Sacrestano

A&P II -- REVIEW SECTION I – Endocrine System, Muscular System

1) Which of the following is true regarding the endocrine system?
    a. The endocrine system demonstrates a slow response to stimuli, compared to the nervous system
    b. The endocrine system uses chemical transmitters called hormones that travel long distances to target cells
    c. The endocrine system can be modified by nervous stimuli
    d. The endocrine system utilizes both exocrine and apocrine structures to communicate to other tissues
    e. Each of these are correct regarding the endocrine system

2) Which of the following statements regarding hormones is incorrect?
    a. Hormones and neurotransmitters require a synapse in order to communicate information to other cells and tissues.
    b. Only cells that have receptors to a certain hormone may be affected by that hormone.
    c. Hormones can cause target cells to alter patterns of gene expression, producing proteins in different quantities
    d. G proteins and cAMP are second messengers that serve to enhance or amplify the hormonal effect.
    e. Each of these are correct regarding hormones.

3) Which of the following statements is false regarding the hypothalamus?
    a. Hypothalamus is an organ with neural & endocrine functions.
    b. Controls the adenohypophysis via releasing and inhibiting hormones.
    c. Directly secretes a hormone that lowers blood pressure by increasing urine output.
    d. Directly secretes a hormone that increases force of contractions during labor.
    e. Each of these statements regarding the hypothalamus is correct.

4) Which of the following hormones come from anterior lobe of the pituitary gland?
    a. Inhibin
    b. Adrenocorticotropic hormone
    c. Triiodothyronine
    d. Oxytocin
    e. ADH

5) When blood Calcium level is elevated, the body is in a state of *hypercalcemia.* Which gland is responsible for secreting a hormone to return Ca^{2+} level to normal and therefore maintain homeostasis?
    a. Hypothalamus
    b. Pituitary
    c. Thyroid
    d. Parathyroid
    e. Kidney

6) Which of the following is <u>not</u> an effect of a hormone secreted by the adrenal gland?
    a. Temporary elevation of blood sugar
    b. Prolonging of the effect of the sympathetic nervous system
    c. Suppression or limiting of inflammation
    d. Stimulation of thirst
    e. Each of these may be effects of hormones secreted by the adrenal gland

7) Diabetes mellitus is a deficiency or limited activity of which hormone?
    a. Glucagon
    b. Intrinsic factor
    c. Growth hormone
    d. Gastrin
    e. Insulin

8) Match the correct hormone pair that have <u>antagonistic</u> effects?
    a. Calcitonin-parathyroid hormone
    b. Glucagon-gastrin
    c. Estrogen-testosterone
    d. Gonadotropic releasing hormone-luteinizing hormone
    e. Leptin-growth hormone

9) Which connective tissue layer surrounds the biceps femoris muscle belly, separating it from the rest of the body?
    a. Epimyseum
    b. Perimyseum
    c. Endomyseum
    d. Blood
    e. Loose areolar tissue

10) At the skeletal muscle sarcomere, Ca2+ ions do each of the following, except:
    a. Bind to troponin to help uncover tropomyosin
    b. Help expose active sites on actin strands
    c. Is stored in the sarcoplasmic reticulum at terminal cisternae
    d. Helps break the ATP into ADP + inorganic phosphate readying the myosin head to bind another active site
    e. Each of these statements are true regarding calcium

11) During muscle contraction:
    a. The zone of overlap increases in width, while the I band decreases in width
    b. The M line doesn't change, while and the Z-lines move closer together
    c. The H band narrows, while the Zone of overlap increases in width
    d. Choice A and B are both correct
    e. Choice A, B, and C are all correct

12) Which of the following is found in rigor mortis?
    a. Fixed, rigid skeletal muscle contraction after death
    b. Myosin heads remain in bent position as ATP stores are used up
    c. Calcium ion builds up in the cytosol
    d. Active sites on actin remain covered by tropomyosin
    e. Each of these statements occur during rigor mortis

13) When an action potential reaches the axon terminal, what happens next?
    a. The muscle fiber contracts
    b. Acetylcholinesterase breaks down acetylcholine in the synaptic cleft
    c. Endosomes containing neurotransmitter fuse to cell membrane, and release neurotransmitter into the synaptic cleft
    d. Sodium channels open at the motor end plate, moving the cell membrane closer to threshold
    e. The action potential travels directly across neuromuscular junction to the motor endplate

14) Adonis arrives at the gym and spots a dumbbell he wants to use. When attempting to lift the weight, his biceps brachii contract, but the weight is not moved because it is too heavy. This is called?
    a. Isometric contraction
    b. Concentric contraction
    c. Eccentric contraction
    d. Incomplete tetanus
    e. Complete tetanus

15) Since Adonis was unable lift the dumbbell, he decided to use the exercise bike for a cardiovascular workout. During maximum exertion on the exercise bike, Adonis began to breathe heavily and felt "the burn" in his legs. The skeletal muscles of his legs were using primarily which form of respiration at maximum exertion?
    a. Aerobic respiration
    b. Electron transport chain
    c. Oxidative phosphorylation
    d. Glycolyis
    e. Lipolysis
    f. None of the above

16) Which is true of dark (red) muscle?
    a. This muscle is optimized for endurance training
    b. There is less mitochondria in this muscle
    c. This muscle contains more fast-twitch fibers
    d. This muscle contains an equal amount of fast and slow twitch fibers
    e. None of the above statements are correct regarding dark muscle

17) All are characteristics of smooth muscle, except?
    a. Usually forms 2 layers at right angles to each other
    b. Utilizes troponin to help initiate muscle contraction
    c. Contains no striations
    d. Action potentials travel between muscle fibers quickly via tight junctions
    e. Serves to close sphincters, digestive motility, change blood vessel diameter

ANSWER KEY: A&P II -- Review Section I

1 e, 2 a, 3 e, 4 b, 5 c, 6 e, 7 e, 8 a, 9 a, 10 d, 11 e, 12 e, 13 c, 14 a, 15 d, 16 a, 17 b

A&P II -- REVIEW SECTION II – The Heart, Vascular System

18) Which of the following is a valve that contains 2 cusps and allows blood to flow into a ventricle?
    a. Right semilunar valve
    b. Left semilunar valve
    c. Tricuspid valve
    d. Mitral valve
    e. Inferior vena cava

19) Which of the following is responsible for closing the left AV valve?
    a. Beginning of atrial systole (atrial contraction)
    b. Beginning of atrial diastole
    c. Beginning of ventricular systole (ventricular contraction), where pressure in ventricle is greater than left atrium
    d. Beginning of ventricular diastole, where pressure inside aorta is greater than that of left ventricle
    e. Contraction of papillary muscles, which pull on corda tendinae

20) Which of the following statements is <u>false</u> regarding heart disease and myocardial infarction (MI)?
    a. MI is caused by cardiac ischemia resulting in loss of function and eventual tissue death in an area of the myocardium
    b. Cardiac ischemia is caused by occlusion of one or more coronary arteries by atherosclerosis
    c. The most common blocked coronary artery is the left circumflex artery
    d. Common symptoms of MI may include chest pain, shortness of breath, fatigue, clammy skin, nausea, anxiety
    e. The most frequent cause of death in women is heart disease

21) Which of the following statements is **<u>false</u>** regarding the cardiac conducting system?
    a. The conducting system is responsible for the distribution and precise timing of electrical stimulation within the heart muscle.
    b. The conducting system demonstrates auto-rhythmicity and does not require neural or endocrine input in order to function.
    c. The correct order of conduction is: SA node → internodal fibers → AV node → bundle of His → bundle branches → moderator band and Purkinje fibers.
    d. The AV node is the natural pacemaker of the heart, establishing cardiac rhythm at 60-100 bpm.
    e. Each of these statements are correct regarding the cardiac conducting system.

22) What is correct regarding cardiac contractile cells?
    a. Cardiac contractile cells are small, single nucleus, branched, held together by intercalated discs compared to skeletal muscle cells.
    b. Cardiac contractile cells feature a plateau phase in the action potential.
    c. Sources of calcium include sarcoplasmic reticulum and extracellular.
    d. None of these statements are correct regarding cardiac contractile cells
    e. Each of these statements are correct regarding cardiac contractile cells

23) The role of slow calcium channels in the cardiac contractile cell action potential is:
    a. To allow for repolarization.
    b. To allow for slow depolarization.
    c. To increase strength of contraction.
    d. To increase time spent in contraction.
    e. To allow for increased time spent in depolarization.

24) Which statement is <u>false</u> regarding blood flow and phase of the cardiac cycle?
    a. Blood moves from atria to ventricle during atrial contraction.
    b. The Aortic (semilunar) valve is closed during isovolumetric contraction of the left ventricle.
    c. The mitral valve is closed during isovolumetric contraction of the ventricle.
    d. There is no blood flow out of the ventricle when the mitral valve is open.
    e. When pressure of the pulmonary artery is lower than the ventricle, no blood flows.

25) Which of the following is <u>not</u> occurring in the heart when the first heart sound (S_1) is heard?
    a. AV valves close.
    b. Pressure inside the ventricle is greater than that of the atria.
    c. There is essentially no change in volume in the ventricle during S1.
    d. Cardiac contractile cells in the ventricle are depolarizing, recorded as a QRS wave on the ECG.
    e. Each of the above is occurring when the first heart sound (S1) is heard during auscultation.

26) Which statement is correct regarding the Frank-Starling Principle (Starling's Law)?
    a. SV increases as a result of EDV increase.
    b. Heart rate increases with greater venous return.
    c. SV increases in response to greater afterload or peripheral resistance.
    d. SV increases as a result of ESV increase.
    e. None of the above are examples of Starling's Law.

27) Which of the above will increase cardiac output?
    a. Increasing venous return to right atrium
    b. Stimulating the vagus nerve
    c. Increasing peripheral vasoconstriction
    d. Administering a beta blocker medication
    e. Increasing blood viscosity

28) Which of the following factors is **not** involved in determining cardiac output?
    a. Atrial Stretch
    b. Hormonal regulation
    c. Autonomic nervous regulation
    d. Peripheral Resistance
    e. Each of these factors plays a role in determining cardiac output

29) Which of the following is a direct measurement of the oxygen-carrying capacity of blood?
    a. viscosity.
    b. specific gravity.
    c. hemoglobin.
    d. hematocrit.
    e. differential cell count.

30) Which of the following can increase blood flow?
    a. Increasing diameter of arteries and arterioles
    b. Increasing the length of blood vessels
    c. Increasing the hematocrit
    d. Increasing turbulence within blood vessels
    e. None of these statements result in an increased blood flow

31) An obstruction in blood flow to the kidneys would most likely result in:
    a. pernicious anemia.
    b. renal anemia.
    c. secretion of EPO (erythropoietin).
    d. decreased systemic blood pressure.
    e. increased sensitivity to vitamin K.

32) All is true regarding the unique shape of red blood cells **except:**
    a. Red blood cells are shaped like biconcave discs.
    b. Red blood cells shape allows for a larger surface area-to-volume ratio.
    c. Shape allows erythrocytes to carry carbon dioxide from the body's cells to the lungs.
    d. Shape allows red blood cells to form stacked rouleaux when passing through capillaries.
    e. Each of these statements are correct.

33) Type AB blood has which erythrocyte surface typing antigens?
    a. A
    b. B
    c. A and B
    d. no typing antigens
    e. D

34) **(True or False)** A fetus with Type A- blood is at risk for erythroblastosis fetalis from a mother with Type B+.

a. True
b. False

35) Type O blood has antibodies to which of the following in the blood plasma?
a. anti-A
b. anti-B
c. anti-A and anti-B
d. neither anti-A nor anti-B
e. anti-O

36) The common pathway of coagulation is initiated by the:
a. activation of Factor X.
b. activation of proenzymes (Factor XII) exposed to collagen fibers at injury site
c. release of tissue factor (Factor III) by damaged endothelium.
d. release of heparin from the liver.
e. conversion of prothrombin to thrombin.

37) The common pathway of coagulation ends with the:
a. sticking of platelets to damaged tissue.
b. activation of a proenzyme exposed to collagen.
c. release of tissue factor by damaged endothelium.
d. activation of Factor X.
e. conversion of fibrinogen to fibrin.

38) Fluid is reabsorbed in which of the following vessels?
a. arteries.
b. arterioles.
c. veins.
d. venules.
e. capillaries.

39) All are responses to hemorrhaging **except:**
a. Cardiac and aortic reflexes increase cardiac output.
b. Constriction of arterioles.
c. Constriction of veins.
d. ADH and angiotensin II are released.
e. Capillary hydrostatic pressure is increased.

40) Blood flow to a tissue will <u>decrease</u> if:
    a. the relative acidity of the local tissue is increased.
    b. the concentration of oxygen (O2) at the local tissue is increased.
    c. the end-diastolic volume (EDV) of the left ventricle is increased, engaging Frank-Starling's Law.
    d. stretch receptors in both atria detect increased venous return and initiate the Bainbridge reflex.
    e. histamine is released locally.

41) Leia suffered a deep laceration (cut) to her right forearm immediately distal to her elbow and notes blood spurting from the wound. At which of the following pressure points may direct pressure be placed to slow or stop severe bleeding:
    a. Carotid
    b. Popliteal
    c. Radial
    d. Femoral
    e. Brachial

42) Which of the following equations shows the correct relation between blood flow (F), pressure (P), and resistance (R)?
    a. P = F / R
    b. F = P / R
    c. R = F + R
    d. F = P - R
    e. E = MC2

43) Calculate the net filtration pressure (NFP) with a capillary hydrostatic pressure (CHP) of 20 mm Hg and a blood colloid oncotic pressure (BCOP) of 25 mm Hg. Then determine if filtration or reabsorption occurs.

    NFP = _____ and results in a fluid _____.

    a. -5 mm Hg; filtration
    b. 5 mm Hg; reabsorption
    c. 5 mm Hg; filtration
    d. -5 mm Hg; reabsorption
    e. 45 mm Hg; filtration

<u>ANSWER KEY:</u> A&P II -- Review Section II

18 d, 19 c, 20 c, 21 d, 22 e, 23 e, 24 e, 25 e, 26 a, 27 a, 28 e, 29 c, 30 a, 31 c, 32 e, 33 c, 34 b, 35 c, 36 a, 37 e, 38 e, 39 e, 40 b, 41 e, 42 b, 43 d

A&P II -- REVIEW SECTION III – Lymphatics & Immunity, The Respiratory System

44) **(True or False)** A function of the lymphatic system is to help maintain normal blood volume by returning interstitial fluid as lymph to the venous circulation.
   a. True
   b. False

45) Any of the following may provoke an immune response **except:**
   a. an injury to tissue, such as a cut or chemical burn.
   b. influenza virus.
   c. cancer cells.
   d. a healthy cell in a person with autoimmune disease.
   e. Each of the above may provoke an immune response.

46) Which of the following lymphocytes are involved in innate immunity?
   a. natural killer (NK) cells
   b. plasma cells
   c. CD8 T cells
   d. B memory cells
   e. neutrophils

47) An inflammatory response is triggered when:
   a. red blood cells release pyrogens.
   b. T cells release interferon.
   c. mast cells release histamine and heparin.
   d. A patient is administered a local immunosuppressant such as cortisone.
   e. blood flow to an area is decreased.

48) The classic pathway of complement activation begins when the protein C1 binds to:
   a. the cell wall of bacteria.
   b. the plasma membrane of bacteria.
   c. two antibodies attached to an antigen.
   d. a cell surface antigen.
   e. a plasma protein.

49) Each of the following is **true** regarding the spleen, **except:**
   a. Spleen is located posterolateral to the stomach, and contacts the diaphragm and left kidney.
   b. Splenic veins, arteries, and lymphatic vessels communicate with the spleen at the hilum.
   c. The spleen is a primary lymphoid organ, serving to filter lymph fluid.
   d. Lymphocytes and dendritic cells are concentrated in the white pulp.
   e. Injury to the spleen is often best treated by splenectomy (excision of the spleen).

50) Activated c3b to the cell wall of an infected cell or pathogen is the end-result of which of the following pathway(s)?
    a. classical pathway.
    b. lectin pathway.
    c. alternative pathway.
    d. classical and alternative pathways only.
    e. classical, lectin, as well as alternative pathways.

51) **(True or False)** All formed elements of the blood possess major histocompatibility complex I (MHC I) on their cell surfaces.
    a. True
    b. False

52) A class of immunoglobulins found concentrated in breast milk, and thus serve to passively and naturally enhance the specific immune system of a newborn is:
    a. IgA.
    b. IgD.
    c. IgE.
    d. IgG.
    e. IgM.

53) A sensitized B cell is activated once:
    a. it binds a helper T cell that releases cytokines.
    b. it binds a cytotoxic T cell.
    c. memory B cells have been cloned.
    d. it has cloned plasma cells.
    e. antibodies have been produced.

54) Which form of epithelial tissue may be found in the upper respiratory system (URS)?
    a. pseudostratified ciliated columnar epithelium.
    b. moist cuboidal epithelium.
    c. simple squamous epithelium.
    d. stratified squamous epithelium.
    e. None of the above tissue types are found in the URS.

55) Which respiratory division includes the larynx and respiratory structures distal?
    a. upper respiratory tract.
    b. lower respiratory tract.
    c. internal respiratory tract.
    d. alveoli of the respiratory tract.
    e. respiratory mucosa.

56) The nasal conchae epithelial surface serves to:
    a. Warm and moisten inhaled air, via air turbulence.
    b. Help filter dust and insects from the inhaled air
    c. Recapture moisture from exhaled air to preserve fluid.
    d. Promote olfactory sensation.
    e. All of the above are correct.

57) Which of the following structures protects the lower respiratory system from food and fluid bolus during swallowing?
    a. larynx.
    b. epiglottis.
    c. vestibule.
    d. pharynx.
    e. tongue.

58) The "Adams' Apple" is the:
    a. thyroid cartilage.
    b. cricoid cartilage.
    c. corniculate cartilage.
    d. cuneiform cartilage.
    e. epiglottis

59) Which of the following structures most is responsible for determining pulmonary resistance?
    a. visceral and parietal pleura
    b. Trachea
    c. Bronchi
    d. Bronchioles
    e. Alveoli

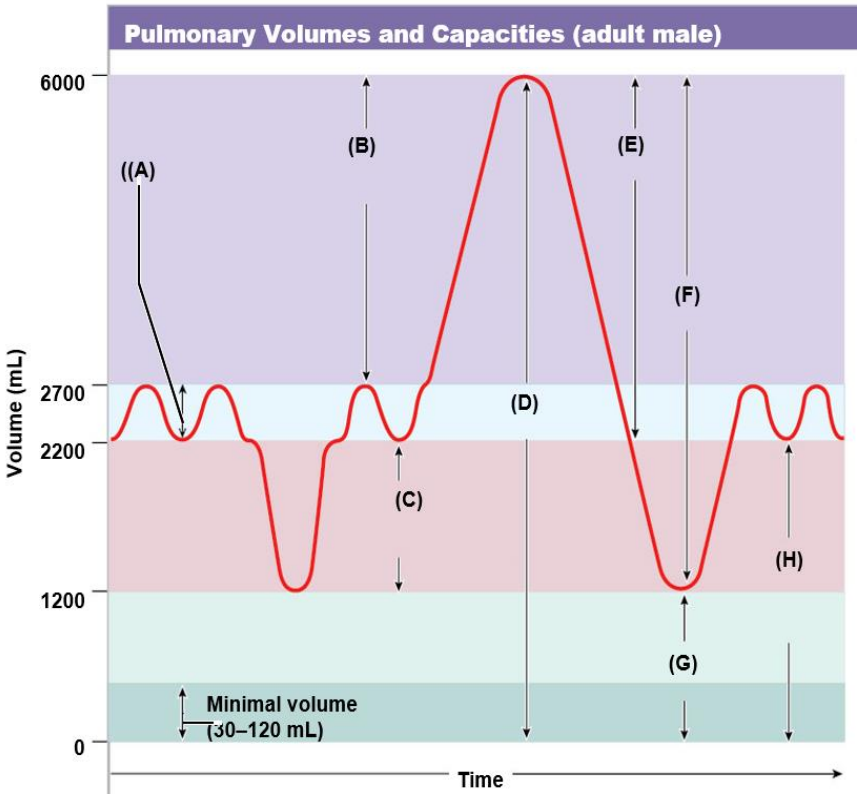
60) In which direction does carbon dioxide move during external respiration?
    a. from the blood into the tissue cells
    b. from the blood into the lungs
    c. from the lungs into the atmosphere
    d. from the tissue cells into the blood
    e. from the lungs into the blood

61) During hyperpnea:
    a. only the internal intercostal muscles contract.
    b. inspiration involves muscular contractions and expiration is passive.
    c. inspiration is passive and expiration involves muscular contractions.
    d. both inspiration and expiration are passive.
    e. both inspiration and expiration involve muscular contractions.

62) The pulmonary ventilation rate for someone with tidal volume of 500 mL and a respiration rate of 14 bpm is:
    a. 6,000 L/min
    b. 6 L/min
    c. 7 L/min
    d. 4.2 L/min
    e. 4.55 L/min

63) Which of the following factors would decrease the amount of oxygen discharged by hemoglobin to peripheral tissues?
    a. increased temperature
    b. decreased pH
    c. decreased tissue PO2
    d. decreased amounts of BPG
    e. Increased tissue PCO2

64) An increase in the level of carbon dioxide in the blood will result in a(n):
    a. decrease in the rate of breathing.
    b. increase of the respiratory rate.
    c. decrease of pulmonary ventilation.
    d. decrease of the alveolar ventilation rate.
    e. decrease in the vital capacity.



65) Identify and calculate the following volumes and capacities:

a. Tidal Volume
b. Inspiratory Reserve Volume
c. Expiratory Reserve Volume
d. Residual Volume
e. Total Lung Capacity
f. Inspriatory Capacity
g. Functional Residual Capacity

ANSWER KEY: A&P II -- Review Section III

44 a, 45 e, 46 a, 47 c, 48 c, 49 c, 50 e, 51 a, 52 a, 53 a, 54 a 55 b, 56 e, 57 b, 58 a, 59 d, 60 d, 61 e, 62 c, 63 d, 64 b, 65 a. A (500mL), b. B (3300mL), c. C (1000mL), d. G (1200mL), e. D (6000mL), f. E (3800mL), g, H (2200mL), 66

A&P II -- REVIEW SECTION IV – Urinary System, Acid-Base Balance

66) Which of the following activities is **not** related to kidney function?
   a. control of hydrogen ion and pH in the blood
   b. control of wastes in the blood
   c. lipid digestion
   d. regulation of blood pressure
   e. maintenance of various blood ion concentrations

67) Measurement of the functions of a nephron reveals a glomerular capillary pressure of 59 mm Hg, and a pressure in the capsular space of 15 mm Hg. Assuming that the blood colloid osmotic pressure is 30 mm Hg, and that essentially no plasma proteins are filtered by the glomerulus, what is the net filtration pressure in this case?
   a. 30 mm Hg
   b. 14 mm Hg
   c. 59 mm Hg
   d. 74 mm Hg
   e. 30 mm Hg

68) The <u>inability</u> of the kidneys to excrete adequately to maintain homeostasis is:
   a. glomerulonephritis.
   b. polycystic kidney disease.
   c. calculi.
   d. renal failure.
   e. hematuria.

69) Which hormone plays a central role in determining the rate of sodium reabsorption and potassium secretion?
   a. Insulin
   b. aldosterone
   c. BNP
   d. ANP
   e. epinephrine

70) Which hormone does **<u>not</u>** play a role in regulating fluid and electrolyte balance?
   a. ADH
   b. aldosterone
   c. leptin
   d. atrial natriuretic peptide
   e. B-type natriuretic peptide

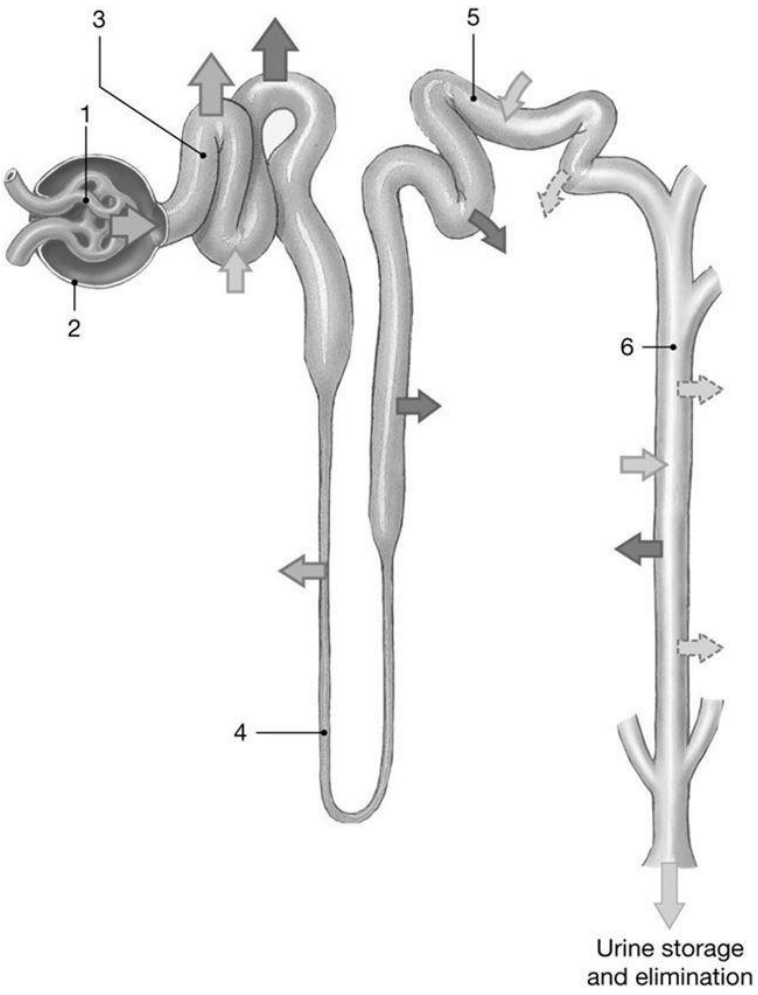
71) The primary role of the phosphate buffer system is to?
    a. buffer stomach acid
    b. buffer carbonic acid formed by carbon dioxide
    c. limit pH changes caused by metabolic and fixed acids
    d. buffer the urine
    e. increase ventilation

72) When the pH _____, a state of alkalosis exists.
    a. rises above 7
    b. falls below 7
    c. falls below 6.5
    d. falls below 7.35
    e. rises above 7.45

73) Which of the following is a <u>respiratory</u> response to acidosis?
    a. secretion of H+
    b. increase tubule buffer activity
    c. decreased respiratory rate
    d. decreased ventilation-perfusion ratio
    e. removal of CO2

74) The kidney does all of the following when the pH of the extracellular fluid **drops**, **<u>EXCEPT:</u>**
    a. excrete more hydrogen ions.
    b. excrete fewer bicarbonate ions.
    c. secrete more hydrogen ions and more bicarbonate ions.
    d. secrete more hydrogen ions and fewer bicarbonate ions.
    e. Each of the above statements are true

75) Hypocapnia refers to:
    a. Low oxygen.
    b. Low hemoglobin.
    c. Low carbon monoxide.
    d. High sodium.
    e. High chloride.



76) Refer to the diagram of the nephron and answer the following:
   a. What are the parts of the nephron (labelled 1 through 6 in the diagram)?
   b. What process(es) occur at each location? (ie., filtration occurs at location #1, the glomerular capsule, etc.)
   c. Where are nutrients, vitamins, and water reabsorbed?
   d. Where does countercurrent exchange occur (how does countercurrent exchange occur)?
   e. Where are toxins, drugs excreted?
   f. Which area(s) are most sensitive to hormones such as ADH and aldosterone?

77) The dartos muscle is responsible for:
   a. Temperature regulation.
   b. hernia.
   c. Wrinkled appearance of scrotum.
   d. Maintenance of pH.
   e. Sperm motility.

78) The _____ is the endometrial layer that remains essentially unchanged during the menstrual cycle.
    a. functional layer
    b. corpus albicans
    c. basal layer
    d. myometrium
    e. stroma

79) The female gonad is called a(n)
    a. placenta.
    b. fimbriae.
    c. ovary.
    d. Corpus luteum.
    e. uterus.

80) Which of the following hormones is secreted by corpus albicans?
    a. Estrogen
    b. Progesterone
    c. Luteinizing hormone
    d. Oxytocin
    e. No hormones are secreted by the corpus albicans

81) The pituitary hormone that stimulates the interstitial endocrine cells to secrete estrogen is
    a. FSH.
    b. LH.
    c. ACTH.
    d. GnRH.
    e. GH.

ANSWER KEY: A&P II -- Review Section IV

66 c, 67 b, 68 d, 69 b, 70 c, 71 c, 72 e, 73 e, 74 e, 75 (various answers), 76 c, 77 c, 78 c, 79 c, 80 e, 81 d