



Anatomy & Physiology, 11th or 12th ed. (can be International 12th ed.)
by Ross and Wilson

CLASS: G210-B
Part Two Test Questions

Part two of your test covers chapters 4-9

Chapter 4

1. Blood is a fluid connective tissue. It circulates constantly around the body, allowing constant communication between tissues distant from each other. Blood is composed of a clear, straw-colored, watery fluid called _____ in which several different types of blood cells are suspended.
2. The constituents of plasma are water and dissolved and suspended substances, including: plasma proteins, inorganic salts, nutrients, waste materials, hormones, and gases. Plasma viscosity (thickness) is due to plasma proteins, mainly _____ and _____.
3. Plasma proteins, with the exception of immunoglobulins, are formed in the _____.
4. There are three types of blood cells: erythrocytes (_____), platelets (_____), and leukocytes (_____)
5. Red blood cells are the most abundant type of blood cell. Their main function is in gas transport, mainly of oxygen. Because they have no nucleus, they can't divide (replicate) and so need to be continually replaced by new cells from the red bone marrow. Which two vitamins are required for red blood cell synthesis? _____, _____
6. Hemoglobin is a protein that contains a pigmented _____ - containing complex called heme (haem). An average red blood cell carries 280 _____ hemoglobin molecules, giving each cell a theoretical oxygen-carrying capacity of over a billion oxygen molecules!

7. The life span of erythrocytes, red blood cells, is about 120 days before being broken down (hemolysis) in the spleen, bone marrow, and liver. The iron released during breakdown is reused to make new blood cells. The breakdown also results in the formation of biliverdin which is further reduced to the yellow pigment bilirubin and transported to the liver. In the liver, bilirubin is changed from a fat-soluble to a water-soluble form and is excreted as part of _____.
8. Leukocytes, white blood cells, have the important functions of _____ and _____. Rising white cell numbers in the blood stream usually indicate a physiological problem, e.g. infection, trauma, malignancy.
9. Leukocytes are divided into two categories: granulocytes and agranulocytes. Granulocytes include the neutrophils, eosinophils, and basophils. Neutrophils are small, fast and active _____ that protect the body from bacterial invasion and remove dead cells and debris from damaged tissues.
10. Eosinophils help with the elimination of _____. They are also involved in both the production of tissue inflammation and lowering inflammation (they adjust to the needs of the body)
11. Basophils are closely associated with _____ reactions but it is the mast cells that result in the rapid onset of allergy symptoms.
12. The leukocytes (white blood cells) known as agranulocytes include the monocytes and lymphocytes. Monocytes are the largest and develop into macrophages in the tissues. A macrophage protects the body by “engulfing” indigestible material like dust and bacteria. Macrophages also make and release various active chemicals called _____.
13. Lymphocytes develop from stem cells in the red bone marrow and from precursors in lymphoid tissue. There are two distinct types of lymphocytes: _____ and _____.
14. The third and last type of blood cells are called thrombocytes, platelets. Platelets carry substances that promote blood clotting. About 1/3 of the platelets are stored in the _____. In an emergency they are released as required to control excessive bleeding.
15. Anemia is the inability of the blood to carry enough _____ to meet body needs.
16. Iron deficiency can result from deficient intake for needs or poor absorption from the alimentary tract. Iron absorption depends on an acid environment in the_____.

17. Pernicious anemia is the most common form of vitamin B12 deficiency. It is an autoimmune disease that destroys intrinsic factor and parietal cells in the stomach. B12 deficiency anemia, regardless of cause, leads to _____ neurological damage.
18. _____ anemia is the result of bone marrow failure. Because the bone marrow also produces leukocytes and platelets, leukopenia (low white cell count) and thrombocytopenia (low platelet count) are also likely.
19. Leukemia: a malignant proliferation of white blood cell precursors by the bone marrow. The proliferation of immature leukemic blast cells crowds out other blood cells formed in the bone marrow. This can cause anemia, low white cell count and a low platelet count. Because the leukocytes are immature when released, _____ is reduced and the risk of _____ is high.
20. Vitamin K is required by the liver for the synthesis of many clotting factors and therefore deficiency leads to abnormal clotting. Vitamin K is fat-soluble and _____ are required in the colon for its absorption.

Chapter 5

It may be helpful to read the questions before reading the chapter!

There are **many great diagrams to help us “see” how the blood flows** through the heart, to the lungs, legs, arms, liver, etc. **Don't try to memorize details like:**, the arteries inner lining of squamous epithelium called endothelium is called tunica intima!

Cardio (heart), vascular (blood vessels) System: The pumping action of the heart provides constant circulation of the blood through blood vessels. The blood vessels provide both pulmonary circulation and the systemic circulation of blood. The lymphatic system is connected, both structurally and functionally to the cardiovascular system.

Arteries are blood vessels responsible for carrying oxygen-rich blood away from the heart to the body.(with the exception of the pulmonary artery and umbilical artery).**Veins** are blood vessels that carry blood low in oxygen from the body back to the heart for reoxygenation (with the exception of pulmonary veins and umbilical vein).

21. The right side of the heart pumps blood to the lungs (the _____ circulation) where gas exchange occurs (the blood collects oxygen from the airsacs and excess carbon dioxide diffuses into the airsacs for exhalation). Carbon dioxide is one the waste products of cell metabolism. It diffuses into the blood and the blood transports it to the lungs for excretion.

“Oxygen-poor blood is pumped to the lungs from the heart (arterial circulation). Oxygen-rich blood moves from the lungs to the heart through the pulmonary veins (venous circulation). Pulmonary circulation also includes capillary circulation. Oxygen you breathe in from the air passes through your lungs into your blood through the many capillaries in the lungs. Oxygen-rich blood moves through your pulmonary veins to the left side of your heart and out of the aorta to the rest of your body.” - <https://www.nhlbi.nih.gov/health-topics/how-heart-works>

22. The left-side of the heart pumps blood into the _____ circulation, which supplies the rest of the body. Here, tissue wastes are passed into the blood (and lymph) for excretion, and body cells extract nutrients and oxygen.
23. Arteries have thicker walls than veins to withstand the high pressure of arterial blood. The arteries branch out into the body and as they do, they become smaller. Arterioles are the smallest arteries and they branch out and become even smaller until they are the minute _____.
24. Veins return the depleted blood to the heart under low pressure. When cut, the veins _____ while the thicker walled arteries remain open. When an artery is cut blood spurts at high pressure while a slower, steady flow of blood escapes from a vein.
25. The veins also branch out - the smallest veins are called _____. At any one time 2/3 of the body's blood is in the venous system.
26. Not all the water and cell waste products return to the blood capillaries. Of the 24 liters or so of fluid that moves out of the blood across capillary walls every day, only about 21 liters return to the bloodstream (through the vein system). Extra tissue fluid and some cell waste materials enter the _____ capillaries.
27. The heart wall is composed of three layers of tissue: pericardium, _____ and endocardium. The pericardium is the outermost layer and is made up of two sacs (thin layer of fluid between them).

Note: Pericarditis is the swelling and irritation (inflammation) of the pericardium, Sharp chest pain occurs when the irritated layers of the pericardium rub against each other. It is often a viral or suspected viral infection but the symptoms can closely resemble a heart attack - always have a medical doctor rule out heart attack!

28. The heart possesses the property of autorhythmicity, which means it generates its own _____ impulses and beats independently of nervous or hormonal control. However, it is supplied with both sympathetic and parasympathetic nerve fibers which increase and decrease respectively the intrinsic heart rate. In addition the heart responds to a number of circulating hormones, including adrenaline (epinephrine) and thyroxine.

The electrical system is confusing to read. Below is an better outline/explanation

“Your heart's electrical system controls all the events that occur when your heart pumps blood. Your heart's electrical system is made up of three main parts:

- The sinoatrial (SA) node, located in the right atrium of your heart
- The atrioventricular (AV) node, located on the interatrial septum close to the tricuspid valve
- The His-Purkinje system (bundle of His), located along the walls of your heart's ventricles

A heartbeat is a complex series of events. These events take place inside and around your heart. A heartbeat is a single cycle in which your heart's chambers relax and contract to pump blood. This cycle includes the opening and closing of the inlet and outlet valves of the right and left ventricles of your heart.

Each heartbeat has two basic parts: diastole and systole. During diastole, the atria and ventricles of your heart relax and begin to fill with blood. At the end of diastole, your heart's atria contract (atrial systole) and pump blood into the ventricles. The atria then begin to relax. Your heart's ventricles then contract (ventricular systole), pumping blood out of your heart.

Each beat of your heart is set in motion by an electrical signal from within your heart muscle. In a normal, healthy heart, each beat begins with a signal from the SA node. This is why the SA node sometimes is called your heart's natural pacemaker. Your pulse, or heart rate, is the number of signals the SA node produces per minute. The signal is generated as the vena cavae fill your heart's right atrium with blood from other parts of your body. The signal spreads across the cells of your heart's right and left atria.

This signal causes the atria to contract. This action pushes blood through the open valves from the atria into both ventricles. The signal arrives at the AV node near the ventricles. It slows for an instant to allow your heart's right and left ventricles to fill with blood. The signal is released and moves along a pathway called the bundle of His, which is located in the walls of your heart's ventricles.

From the bundle of His, the signal fibers divide into left and right bundle branches through the Purkinje fibers. These fibers connect directly to the cells in the walls of your heart's left and right ventricles. The signal spreads across the cells of your ventricle walls, and both ventricles contract. However, this doesn't happen at exactly the same moment.

The left ventricle contracts an instant before the right ventricle. This pushes blood through the pulmonary valve (for the right ventricle) to your lungs, and through the aortic valve (for the left ventricle) to the rest of your body.

As the signal passes, the walls of the ventricles relax and await the next signal.

This process continues over and over as the atria refill with blood and more electrical signals come from the SA node.”

<https://www.nhlbi.nih.gov/health-topics/how-heart-works>

29. Blood pressure is the force or pressure that the blood exerts on the walls of the blood vessels. Blood pressure = _____ output x _____ resistance.
30. Constriction and dilation of the arterioles are the main determinants of peripheral resistance. _____ causes blood pressure to rise and vasodilation causes it to fall.

Several pages of circulation to read - don't try to memorize!

31. Shock (circulatory failure) occurs when the metabolic needs of cells are not being met because of inadequate blood flow. Septic shock is caused by severe infections in which bacterial _____ are released into the circulation and trigger a massive inflammatory and immune response.
32. _____ shock may occur with sudden acute pain, severe emotional experiences, spinal anesthesia and spinal cord damage.
33. Thrombosis is the formation of a blood clot (_____) inside a blood vessel, interrupting blood supply to the tissues.
34. _____ is the blocking of a blood vessel by any mass of material (an embolus) traveling in the blood. This is usually a thrombus or a fragment of a thrombus but other there are other embolic materials.
35. Infarction is a term given to _____ death because of interrupted blood supply.
36. Atherosclerosis (the presence of plaques) is considered to be a disease of older people because that is when the clinical signs appear but, plaques start to form in _____ in developed countries.

Note: Patches of atheroma are like small fatty lumps that develop within the inside lining of blood vessels (arteries). Atheroma is also known as atherosclerosis and 'hardening of the arteries'. Patches of atheroma are often called plaques of atheroma. Over time patches of atheroma can become larger and thicker. This can restrict and reduce the blood flow through the artery. Sometimes a patch of atheroma may develop a tiny crack or rupture on the inside surface of the blood vessel. This may trigger a blood clot (thrombosis) to form over the atheroma, which may completely block the blood flow.

37. Aneurysms are abnormal local dilations of arteries, which vary considerably in size. If an aneurysm ruptures, _____ follows, the consequences of which depend on the site and extent of the bleed.

38. Deep vein thrombosis (DVT) carries a significant risk of _____ (often from pulmonary embolism if a clot fragment travels to the lungs).
39. In edema, excess fluid accumulates and causes swelling. It can occur in superficial tissues or deeper organs. There are 4 main causes: Increased _____ blood pressure, decreased plasma osmotic pressure because plasma _____ levels fall, impaired _____ drainage, and increased small-vessel _____.

Chapter 6

The main functions of the lymphatic system

- to collect and transport tissue fluids from the intercellular spaces in all the tissues of the body, back to the bloodstream
- it plays an important role in returning plasma proteins to the bloodstream
- digested fats are absorbed and then transported from the villi in the small intestine to the bloodstream via the lacteals and lymph vessels
- new lymphocytes are manufactured in the lymph nodes
- antibodies are manufactured in the lymph nodes and assist the body to build up an effective immunity to infectious diseases
- lymph nodes play an important role in the defense mechanism of the body. They filter out micro-organisms (such as bacteria) and foreign substances such as toxins, etc.
- it transports large molecular compounds (such as enzymes and hormones) from their manufactured sites to the bloodstream

The lymph nodes are small glands that often occur in clusters. The human body contains about 700 of them. They act as filters that sieve off the harmful (and unused) substances brought by the lymphatic channels. The lymph nodes contain 2 regions within them: the cortex and the medulla. The cortex contains lymphocytes, predominantly B-lymphocytes and some T-lymphocytes. The B lymphocytes mature completely within the bone marrow, while the T-lymphocytes exit the bone marrow immature and attain maturity within the thymus.

40. Fat and fat-soluble materials (e.g. fat-soluble vitamins) are absorbed into the central lacteals (lymphatic vessels) of the _____ .
41. Lymph is a clear watery fluid, similar in composition to plasma, with the important exception of plasma proteins, and is identical in composition to _____ fluid.
42. There is no 'pump', like the heart, involved in the onward movement of lymph, but the muscle layer in the wall of the large lymph vessels has an intrinsic ability to _____ rhythmically. In addition, lymph vessels are compressed by activity in adjacent structures, such as contraction of muscles and the regular pulsation of large arteries.

Note: This is a complicated way to explain that exercise (muscle contraction) and heart rate (exercise again) are key in moving lymph through the body.

43. Lymph vessels become larger as they join together, eventually forming two large ducts, the _____ duct and the right lymphatic duct.
44. Lymph is filtered as it passes through the lymph _____. Particulate matter may include bacteria, dead and live phagocytes containing ingested microbes, cells from malignant tumors, worn-out and damaged tissue cells and inhaled particles.
45. _____ T-lymphocytes and B-lymphocytes multiply in lymph nodes.
46. Unlike lymph nodes, the spleen has no afferent lymphatics entering it, so it is not exposed to _____ spread by lymph.
47. Mucosa-associated lymphoid tissue (MALT) is found in the gastrointestinal, respiratory & genitourinary tracts, all systems of the body exposed to the _____ environment.

Chapter 7

48. "Each neuron consists of a cell body, one _____ and many _____.
49. Transmission of nerve signals is both electrical and _____.
50. Myelinated neurons: Large axons and those of the peripheral nerves are surrounded by a myelin sheath. Myelin is a _____ substance.

Note: Most of the axons in the central nervous system are wrapped in myelin. Myelin insulates and protects the axon and helps speed nerve transmission. The destruction of myelin (demyelinating diseases) results in multiple sclerosis (MS), acute disseminated encephalomyelitis (ADEM), peripheral neuropathy/polyneuropathy, and Guillain-Barre syndrome. "Guillain-Barré syndrome (GBS) is the leading cause of acute flaccid paralysis in developed countries and is characterized by various degrees of weakness, sensory abnormalities and autonomic dysfunction.

51. Nerve impulses have two principal ions involved: _____ (the main extracellular cation) and _____ (the main intracellular cation).
52. Motor nerves originate in the brain, spinal cord and autonomic ganglia. _____ nerves are involved in voluntary and reflex skeletal muscle contraction. The autonomic or involuntary part of the nervous system is separated into two divisions: _____ and _____.

53. The central nervous system consists of the brain and the spinal cord. They are completely surrounded by three layers of tissue, the _____, lying between the skull and the brain, and between the vertebral foramina and the spinal chord.
54. The brain contains _____ irregular-shaped cavities, or ventricles, containing cerebrospinal fluid (CSF).
55. The Cerebrum is the largest part of the brain. It is divided by a deep cleft, into right and left cerebral hemispheres. Deep within the brain the hemispheres are connected by a mass of white matter (nerve fibers) call the _____.
56. Hypothalamus: a small but important structure that is situated immediately above the pituitary gland. The hypothalamus controls the output of hormones from both lobes of the _____ gland.
57. Other functions of the hypothalamus include control of: the _____ nervous system, appetite and satiety, thirst and water balance, body temperature, emotional reactions, sexual behavior and child rearing, sleeping and waking cycles.
58. Except for the cranial nerves, the spinal cord is the nervous tissue link between the _____ and the rest of the body.
59. The peripheral nervous system consists of: _____ pairs of spinal nerves that originate from the spinal cord, 12 pairs of cranial nerves that originate from the brain, and the autonomic nervous system.
60. The majority of the body organs are supplied by both the sympathetic and parasympathetic nerves, which have complementary, and sometimes _____ effects...
61. Sympathetic stimulation prepares the body to deal with exciting and _____ situations, e.g. strengthening its defenses in time of danger and in extremes of environment temperature.
62. Parasympathetic stimulation has a tendency to slow down cardiac and respiratory activity but it _____ digestion and absorption of food and the functions of the genitourinary systems.
63. Stroke (cerebral infarction) occurs when blood flow to the _____ is suddenly interrupted, causing hypoxia.

A cerebral infarction is a type of ischemic stroke resulting from a **blockage in the blood vessels** supplying blood to the brain. Stroke caused by cerebral hemorrhage and subarachnoid hemorrhage is when an **artery in the brain bursts**.

64. Alzheimer's disease is the commonest form of _____ in developed countries.

65. In Parkinson's disease there is gradual and progressive degeneration of _____ releasing neurons in the extrapyramidal system. This leads to lack of control and coordination of muscle movement.

66. Meningitis refers to _____ of the subarachnoid space.

Note: While bacterial meningitis is not common it is very serious.

Meninges: The three membranes that cover the brain and spinal cord.

67. Viral meningitis is the most common form and is usually a relatively _____ infection followed by complete recovery.

68. Herpes zoster viruses cause chickenpox mainly in children and _____ in adults.

69. Creutzfeldt-Jakob disease is caused by a 'slow' virus. Transmission is thought to be via a heat-resistant transmissible particle known as a _____ protein.

Note: A prion is a small infectious particle composed of abnormally folded protein. These mis-folded proteins affect the brain structure by acting as a template, inducing proteins with normal folding to convert to the abnormal prion form. Prion diseases belong to the family of protein misfolding neurodegenerative diseases that also include Alzheimer's, Parkinson's and Huntington's disease and amyotrophic lateral sclerosis (Lou Gehrig's disease). All of these diseases are characterized by the misfolding of one or several host proteins, which leads to neurotoxicity.

Note: "A demyelinating disease is any condition that results in damage to the protective covering (myelin sheath) that surrounds nerve fibers in your brain and spinal cord. When the myelin sheath is damaged, nerve impulses slow or even stop, causing neurological problems." MayoClinic.org

70. In multiple sclerosis (MS), areas of demyelinated white matter are called _____. The areas are irregularly distributed throughout the brain and spinal cord.

71. MS has several factors (causes) involved. It appears to be an autoimmune disorder, possibly triggered by a _____ infection, e.g. measles.

Note: The article, *Multiple Sclerosis Rates Up 50%* by Miranda Hitti appears on the WebMd website and states “The review from the National Institute of Neurological Disorders and Stroke says almost one in 1,000 people in the U.S. have MS. However, the National Multiple Sclerosis Society says that figure could still be low”.

“These findings are consistent with the hypothesis that immunization with the recombinant hepatitis B vaccine is associated with an increased risk of MS, and challenge the idea that the relation between hepatitis B vaccination and risk of MS is well understood”. *Neurology*. 2004 Sep 14;63(5):838-42. *Recombinant hepatitis B vaccine and the risk of multiple sclerosis: a prospective study*. Hernán MA, Jick SS, Olek MJ, Jick H.

“Multiple sclerosis (MS), a chronic inflammatory autoimmune disease of the central nervous system (CNS) commonly diagnosed in adults, is being recognized **increasingly in children**. An estimated 1.7%-5.6% of all patients with MS have clinical symptoms before reaching the age of 18 years”. *Autoimmune Dis*. 2013;2013:673947. *Pediatric multiple sclerosis: current concepts and consensus definitions*. Pena JA1, Lotze TE.

“Acute disseminated encephalomyelitis (ADEM) is characterized by a brief but widespread attack of inflammation in the brain and spinal cord that damages myelin – the protective covering of nerve fibers. **ADEM often follows viral or bacterial infections, or less often, vaccination for measles, mumps, or rubella**. The symptoms of ADEM appear rapidly, beginning with encephalitis-like symptoms such as fever, fatigue, headache, nausea and vomiting, and in the most severe cases, seizures and coma. ADEM typically damages white matter (brain tissue that takes its name from the white color of myelin), leading to neurological symptoms such as visual loss (due to inflammation of the optic nerve) in one or both eyes, weakness even to the point of paralysis, and difficulty coordinating voluntary muscle movements (such as those used in walking). **ADEM is sometimes misdiagnosed as a severe first attack of multiple sclerosis (MS)**, since the symptoms and the appearance of the white matter injury on brain imaging may be similar.

However, ADEM has several features which differentiate it from MS. First, unlike MS patients, persons with ADEM will have rapid onset of fever, a history of **recent infection or immunization**, and some degree of impairment of consciousness, perhaps even coma; these features are not typically seen in MS. **Children are more likely than adults to have ADEM**, whereas MS is a rare diagnosis in children. In addition, ADEM usually consists of a single episode or attack of **widespread myelin damage**, while MS features many attacks over the course of time. **National Institute of Health: Neurological Disorders and Stroke, NINDS Acute Disseminated Encephalomyelitis Information Page**, March 21, 2016

72. Acute disseminated encephalomyelitis may occur as a complication of a viral infection, e.g. measles, chickenpox, or following a primary _____ against viral diseases, mainly in older children and adults. The effects vary considerably, and are similar to those of MS.

73. Peripheral neuropathy is a group of diseases of peripheral nerves NOT associated with inflammation. They are classified as polyneuropathy and _____.
74. _____ syndrome usually occurs 1-3 weeks after an upper respiratory tract infection. There is widespread inflammation accompanied by some demyelination of spinal, peripheral and cranial nerves and spinal ganglia. It is also known as acute inflammatory polyneuropathy.

Chapter 8 (Disorders)

75. Ear infections called external otitis are localized inflammation in the auditory canal. The common cause is the bacterium _____ *aureus*.
76. Acute otitis media is inflammation of the _____ ear cavity, usually caused by upward spread of microbes from an upper respiratory tract infection via the auditory tube.
77. _____ disease is a condition where an accumulation of endolymph causes distension and increased pressure within the membranous labyrinth (inner ear).
78. A sty is caused by a bacterial infection. Infection of tarsal glands may block their _____, leading to cyst formation.
79. Conjunctivitis (inflammation) may be caused by irritants or contagious strains of staphylococci, _____, or haemophilus.
80. Glaucoma is a group of conditions in which intraocular _____ rises due to impaired _____ of aqueous fluid. Persistently raised intraocular pressure may damage the optic nerve leading to impaired vision to complete loss of sight.
81. Cataract: This is clouding of the _____ which may be age-related or congenital, bilateral or unilateral.

Chapter 9

82. The endocrine system consists of glands widely separated from each other with no physical connections. They are commonly called ductless glands because _____ diffuse directly into the bloodstream.
83. The autonomic nervous system is concerned with rapid changes. Endocrine control is mainly involved in slower and more _____ adjustments.

84. The _____ controls the pituitary gland and has an indirect effect on many other endocrine glands.
85. When a hormone arrives at its target cell, it binds to a specific _____, where it acts as a switch influencing chemical or metabolic reactions inside the cell.
86. _____ (GH) is the most abundant hormone synthesized by the anterior pituitary.
87. TSH stands for thyroid stimulating hormone. This hormone is synthesized by the anterior _____ and it is released when the hypothalamus sends out the thyrotrophin releasing hormone (TRH).
88. TSH stimulates growth and activity of the thyroid gland. The _____ gland secretes the hormones T4 (thyroxine) and T3 (tri-iodothyronine).
89. _____ is a steroid hormone secreted by the anterior pituitary. It is released when the hypothalamus releases CRH (corticotrophin releasing hormone).
90. Luteinizing hormone (LH) and Follicle stimulating hormone (FSH) are involved in secretion of the hormones _____ and _____ during the menstrual cycle.
91. _____ is essential for the formation of the thyroid hormones, T4 and T3, so numbered as these molecules (T4,T3) contain four and three atoms of the element iodine respectively.
- Note:** The pituitary releases thyroid stimulating hormone (TSH) when thyroxine levels are low. If TSH levels are high it is usually because the thyroid is not responding to the request to produce hormones - the pituitary continues to send more TSH because it wants the thyroid to produce hormones. This is why high TSH levels are related to hypothyroid function.
92. The main function of the parathyroid hormone is to increase the blood calcium level when it is too low. If the diet is not sufficient in calcium the PTH will stimulate the release of calcium from the _____ into the blood.
93. The two adrenal glands are situated on the upper pole of each _____.
94. The adrenal cortex produces three groups of steroid hormones from _____.
95. _____ (hydrocortisone) is the main glucocorticoid. The adrenal hormones are essential for life, regulating metabolism and responses to stress.

96. Sex hormones secreted by the adrenal cortex are mainly _____ (male sex hormones) and the amounts produced are insignificant compared with those secreted by the testes and ovaries in late puberty and adulthood.

97. Adrenaline has a greater effect on the _____ and metabolic processes whereas noradrenaline has more influence on blood vessel diameter.

Note: The pancreas is an organ that plays an essential role in converting the food we eat into fuel for the body's cells. The pancreas has two main functions: an exocrine function that helps in digestion and an endocrine function that regulates blood sugar. The endocrine component of the pancreas consists of islet cells that create and release important hormones directly into the bloodstream. Two of the main pancreatic hormones are insulin and glucagon. Maintaining proper blood sugar levels is crucial to the functioning of key organs including the brain, liver, and kidneys.

98. Endocrine component of pancreas: The cells that make up the pancreatic islets (islets of Langerhans) are found in clusters irregularly distributed throughout the substance of the pancreas. Pancreatic hormones are secreted directly into the _____.

99. Glucagon _____ and insulin _____ blood glucose levels.

100. Serotonin (5-hydroxytryptamine, 5-HT) is present in platelets, in the brain, and in the _____ wall.

Note: "Serotonin (5-HT) is most commonly thought of as a neurotransmitter in the central nervous system. However, **the predominant site of serotonin synthesis, storage, and release is the enterochromaffin cells (EC) of the intestinal mucosa.** Within the intestinal mucosa, serotonin released from EC cells activates neural reflexes associated with intestinal secretion, motility, and sensation. Because of the importance of serotonin in normal gut function and sensation, a number of studies have investigated potential changes in mucosal serotonin signaling in pathologic conditions. Despite the inconsistencies in the current literature, **changes in serotonin signaling have now been demonstrated in inflammatory bowel disease, irritable bowel syndrome, postinfectious irritable bowel syndrome, and idiopathic constipation.**" - *Dis Colon Rectum*. 2007 Mar;50(3):376-88. *Serotonin and its role in colonic function and in gastrointestinal disorders*. Costedio MM1, Hyman N, Mawe GM.

101. There are three main categories of thyroid dysfunction:

- Abnormal secretion of thyroid hormones T3 and T4 which lead to hyperthyroidism or hypothyroidism
- _____ - enlargement of the thyroid gland
- tumors

102. In Grave's disease an antibody mimics the effects of _____ and causes increased levels of T3 and T4, goiter, and exophthalmos (protrusion of eyeballs) in many cases.
103. Autoimmune thyroiditis: The most common cause of acquired _____ is Hashimoto's disease. Goitre is sometimes present.
104. Goiter is an enlargement of the thyroid gland without signs of hyperthyroidism. It is caused by a relative lack of T3 and T4 and the low levels stimulate the secretion of TSH resulting in an enlargement (hyperplasia) of the thyroid gland. Persistent _____ deficiency is the main cause.
105. Tetany is caused by _____. Low blood calcium levels increase excitability of peripheral nerves.
106. Cushing's syndrome is the result of the hypersecretion of _____.
107. _____ disease is due to hyposecretion of glucocorticoid and mineralocorticoid hormones.
108. Insulin resistance is the result of changes in the cell membranes that _____ the insulin-assisted movement of glucose into the cells.
109. Diabetic people are highly susceptible to infection, especially by bacteria and _____, possibly because phagocyte activity is depressed by insufficient intracellular glucose.

End of Test (Part Two: Chapters 4-9)