

Names: _____

School: _____

Team Number: _____

SCIENCE OLYMPIAD REGIONALS
LAKE NONA

DIVISION B
ANATOMY & PHYSIOLOGY
TEST

Total Score:

115

Part I: Multiple Choice (30 points)

Choose the best answer, and write your answer on the answer sheet.

- 1) The exchange of gases between your blood and tissue cells is known as:
 - A. Pulmonary ventilation
 - B. External respiration
 - C. Internal respiration
 - D. Systemic ventilation

- 2) The final and smallest component of the conducting zone of the respiratory tract is the:
 - A. Tertiary bronchi
 - B. Terminal bronchioles
 - C. Respiratory bronchioles
 - D. Alveolar sacs

- 3) Which factor shifts an oxygen dissociation curve to the right?
 - A. Increase in body temperature
 - B. Decrease in partial pressure of carbon dioxide
 - C. Increase in hemoglobin's affinity for oxygen
 - D. Decrease in 2,3-BPG levels

- 4) The fetal dissociation curve is shifted in which direction relative to the curve for the normal adult?
 - A. Upwards
 - B. Downwards
 - C. To the left
 - D. To the right

- 5) Which of the following is not an effect of high altitudes on the respiratory system?
 - A. Pulmonary artery pressure decreases

- B. The saturation of oxyhemoglobin begins to decrease rapidly
 - C. Hyperpnea
 - D. Hypoxia
- 6) Which nerve in the body controls the diaphragm muscle?
- A. Phrenic nerve
 - B. Thoracodorsal nerve
 - C. Intercostal nerves
 - D. Vagus nerve
- 7) Which gas law states that the volume of a given quantity of gas is directly proportional to its absolute temperature?
- A. Boyle's law
 - B. Charles' law
 - C. Henry's law
 - D. Dalton's law
- 8) If Bob's vital capacity is 4800 mL and his inspiratory capacity is 3700 mL, what is his expiratory reserve volume?
- A. 1100
 - B. 8500
 - C. 6000
 - D. 3000
- 9) What is the name of the cavity in which the heart sits in between the two lungs?
- A. Cardiac notch
 - B. Mediastinum
 - C. Pleural cavity
 - D. Bulla
- 10) Which of the following describes the mechanism of sneezing?

- A. Long drawn deep inspiration followed by complete closure of rima glottidis
 - B. Spasmodic contraction of muscles of expiration
 - C. Long drawn and deep inspiration followed by shorter more forceful expiration
 - D. Inspiration followed by many short convulsive expirations
- 11) How many waves of peristalsis occur in the esophagus?
- A. 1
 - B. 2
 - C. 3
 - D. 4
- 12) Which of the following is not a layer of the mucosa?
- A. Epithelium
 - B. Lamina propria
 - C. Muscularis externa
 - D. Muscularis mucosae
- 13) In the tongue, which are the most abundant forms of papillae?
- A. Fungiform
 - B. Filiform
 - C. Vallate
 - D. Foliate
- 14) Where does the majority of chemical digestion in the stomach occur?
- A. Fundus and body
 - B. Cardia and fundus
 - C. Body and pylorus
 - D. Body
- 15) Which of these nutrients is absorbed mainly in the duodenum?
- A. Glucose

- B. Iron
 - C. Sodium
 - D. Water
- 16) Which cells secrete gastric intrinsic factor?
- A. Chief cells
 - B. Parietal cells
 - C. Enteroendocrine cells
 - D. Foveolar cells
- 17) What are the common terms for mastication and deglutition?
- A. Swallowing; chewing
 - B. Chewing; spitting
 - C. Chewing; swallowing
 - D. Swallowing; spitting
- 18) In which region are brush border cells not found?
- A. Kidney
 - B. Large intestine
 - C. Small intestine
 - D. Stomach
- 19) What is a common way to test if someone has appendicitis?
- A. Perform a colonoscopy
 - B. Touch McBurney's point on patient
 - C. Barium swallow, followed by x-rays
 - D. Biopsy
- 20) Where is chyme converted to feces?
- A. Rectum
 - B. Colon

- C. Anus
 - D. Ileum
- 21) Which immune cells complement both specific and nonspecific defenses?
- A. Natural killer cells
 - B. Eosinophils
 - C. Macrophages
 - D. Mast cells
- 22) What is the process called where leukocytes pass through capillary walls during the inflammatory response?
- A. Margination
 - B. Leukocytosis
 - C. Diapedesis
 - D. Chemotaxis
- 23) What is it called when immune complex formation blocks specific sites on virus or toxin & prohibit binding to tissues?
- A. Precipitation
 - B. Agglutination
 - C. Complement fixation
 - D. Neutralization
- 24) Which immunoglobulin functions mainly as an antigen receptor on B cells that have not been exposed to antigens?
- A. IgA
 - B. IgG
 - C. IgD
 - D. IgM
- 25) When a person receives a vaccine, his or her body:

- A. receives antibodies against a specific pathogen
 - B. immediately begins to fight the infection caused by the pathogens
 - C. creates plasma cells that can produce antibodies against the specific pathogen
 - D. creates antigens to fight the specific pathogen.
- 26) Hemolytic disease of the newborn (HDN) can occur when:
- A. the mother is Rh negative and baby is Rh positive
 - B. the mother is Rh positive and baby is Rh negative
 - C. the mother is Rh negative and baby is Rh negative
 - D. the mother is Rh positive and baby is Rh positive
- 27) In which disease does cancer start in B-cells, and is characterized by a large and fast-growing tumor?
- A. Follicular lymphoma
 - B. Burkitt's lymphoma
 - C. Mantle cell lymphoma
 - D. Hodgkin's lymphoma
- 28) Which of the following is the only lymphoid organ that does not directly fight antigens?
- A. Spleen
 - B. Thymus
 - C. Tonsils
 - D. Appendix
- 29) Which of the following molecules is not generally produced by T cells and macrophages?
- A. growth-inhibiting factors
 - B. cytokines
 - C. colony-stimulating factors
 - D. tissue thromboplastin

30) Hypersensitivity reactions:

- A. are sometimes mediated by IgE
- B. may involve immune complexes
- C. may involve complement, histamine, neutrophils or IgG
- D. all of the above.

Part II: Fill in the Blank (30 points)

Choose the best word or words, and write your answers on your answer sheet.

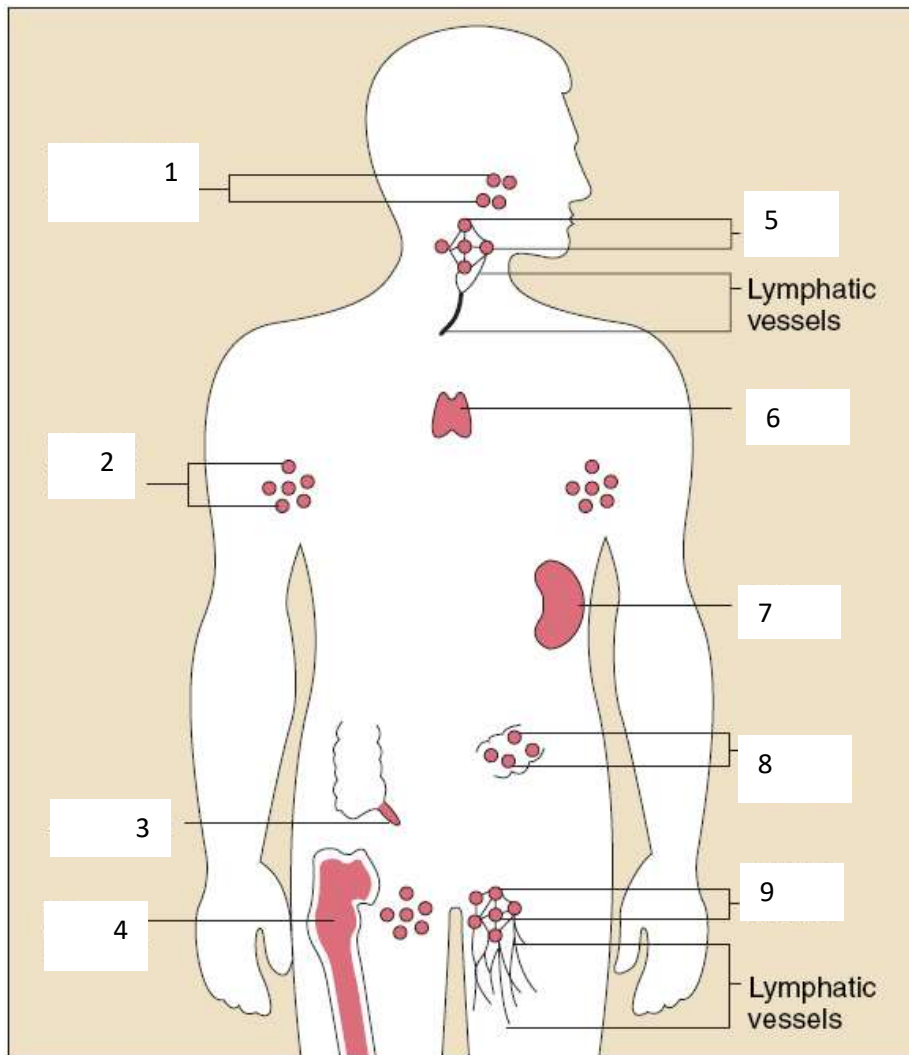
- 1) When the diaphragm relaxes, the thoracic cavity _____ in size.
- 2) Alveolar macrophages are also called _____.
- 3) When you laugh while eating, the _____ begins to move back, but is thrust forward suddenly, sending the contents of your mouth to your nasal cavities to fly out of your nose.
- 4) The respiratory mucosa is made up of _____ epithelium.
- 5) During exhalation, _____ intercostals muscles and other muscles can be stimulated.
- 6) Accelerated respiration is also known as _____.
- 7) The lung's ability to stretch and expand is referred to as _____.
- 8) A _____ is an abnormal collection of air in the pleural space between the lung and the chest wall, resulting in a collapsed lung.
- 9) _____ is a category of respiratory disease characterized by airway obstruction.
- 10) Clubbing in the fingers is a common symptom of _____.
- 11) Saliva contains _____, an enzyme that digests starch.
- 12) Lipases break fat globules down into smaller droplets, a process known as _____.
- 13) Nutrients are absorbed into capillary blood and are transported to the liver via the _____.
- 14) One theory about the function of the appendix states that it serves as a reservoir to _____.

- 15) The two major lobes of the liver are divided by the _____.
- 16) The pancreas produces _____, which helps counter the acidic quality of chyme that enters the duodenum from the stomach.
- 17) The large intestine undergoes several muscular contractions called _____, which propel the colon towards the anus to help move food.
- 18) If a tumor affects the digestive system, it is called a _____.
- 19) A _____ ulcer can penetrate through the wall of the stomach or small intestine, allowing the luminal contents to leak into the abdominal cavity.
- 20) More than 80% of colorectal cancer cases arise from a certain form of polyp called _____ polyps.
- 21) _____ or ear wax protects the ear canal by trapping dirt and dust particles.
- 22) The _____ immune response defends against intracellular pathogens and cancer by binding to and lysing the infected cells or cancer cells.
- 23) _____ T cells play a role in transplant rejection.
- 24) The inflammatory response is characterized by swelling, pain, redness, warmth, and _____.
- 25) Substances that induce fevers are called _____.
- 26) _____ is an autoimmune disorder characterized by a butterfly rash.
- 27) There are _____ types of hypersensitivity.
- 28) Type 1 diabetes is caused by the destruction of _____ in the pancreas.
- 29) Secretions from mucous membranes (saliva, tears, sweat, etc.) contain antimicrobial proteins such as _____, which break down bacterial cell walls.
- 30) _____ asthma is the more common form of asthma, and it typically develops during childhood.

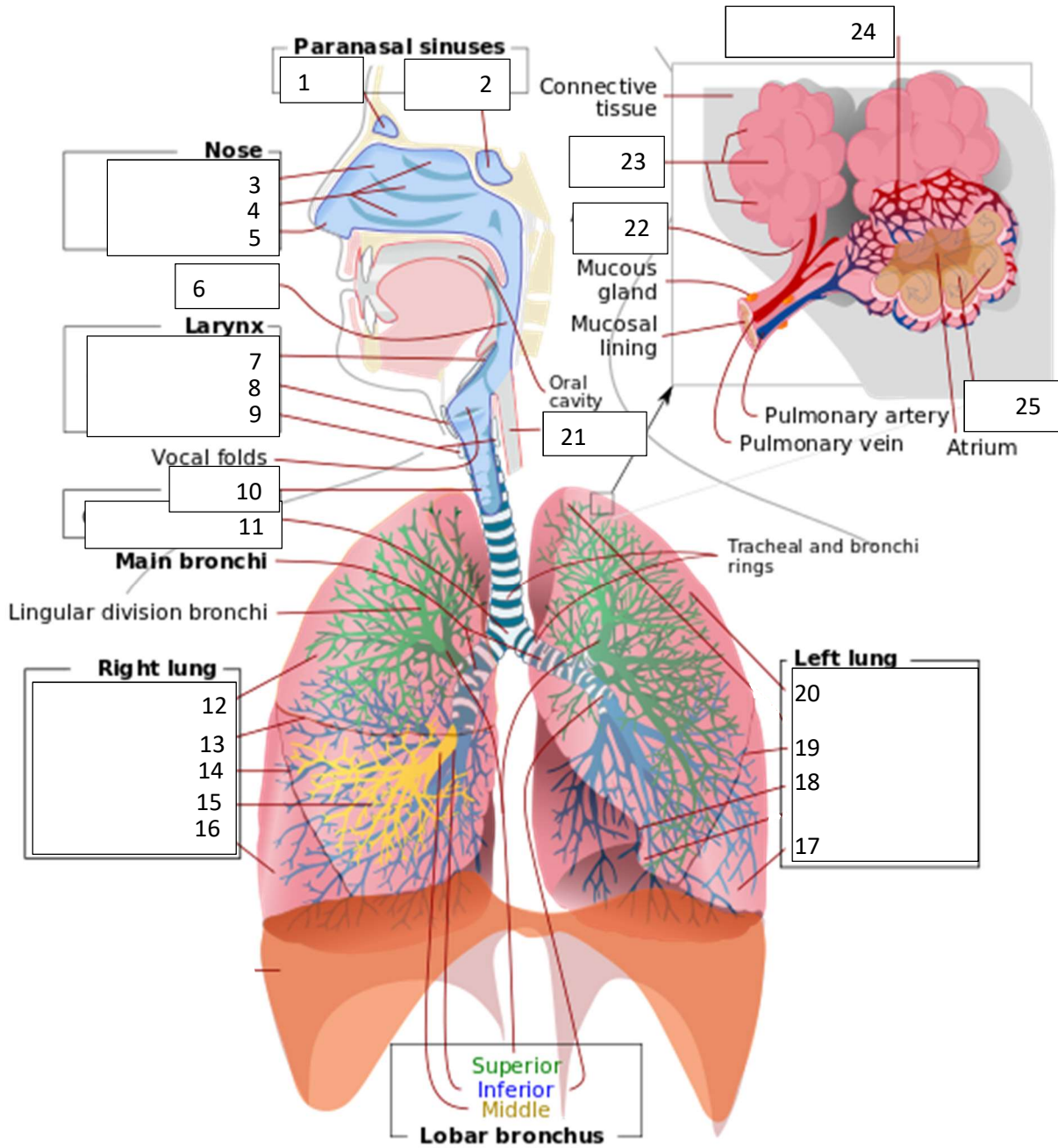
Part III: Labeling (55 points)

Label the following diagrams and write your answers on your answer sheet.

Immune System:



Respiratory System:



Digestive System:

