National Cathedral Science Olympiad Invitational Tournament

Division B Anatomy and Physiology Student Test

December 2017

School Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Team Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Points Awarded: \_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_

Tie Breakers:

Question : #10

Question : #17

Question : #33

Directions: Fill in your response for each question in the space provided on the answer sheet corresponding to that question. Ambiguous or illegible responses will be scored as incorrect. Unless noted otherwise, all questions have a point value of 1.

**DO NOT OPEN THIS PACKET UNTIL INSTRUCTED TO DO SO**

**Respiratory System:**

1. If a person's vital capacity is 4000mL, her expiratory reserve volume is 1000mL, and

her inspiratory reserve volume is 2500mL, and her tidal volume is \_\_\_\_\_\_.

a. 3500mL

b. 3000mL

c. 1500mL

d. 500mL

2. Most of the carbon dioxide (CO2) carried in the blood is carried \_\_\_\_\_\_\_\_\_\_.

a. as a dissolved gas in the water of the plasma

b. as the bicarbonate ion (HCO3‐) in plasma

c. bound to hemoglobin in the red blood cells

d. as micro-bubbles in the plasma

3. The acronym COPD is the abbreviation for:

a. Cystic Occlusion Pneumatic Disorder

b. Colloid Osmotic Pressure Disorder

c. Cancerous Oncologic Pleural Disease

d. Chronic Obstructive Pulmonary Disease

4. Constant use of non-steroidal anti-inflammatory drugs (NSAIDs) increases the risks of which of the following:

I. Duodenal Ulcers

II. Peptic Ulcers

III. Gastric Ulcerts

a. I only

b. II only

c. III only

d. I, II, and III

True or False:

5. Smoking can lead to lung cancer and cigarette smoke contains numerous known carcinogens.

6. Wheezing and Asthma result from constriction (narrowing) of the smaller bronchi and bronchioles.

7. External respiration is the movement of air from the outside to the lungs.

8. In the lungs oxygen molecules (O2) get attached to carbon atoms to become carbon dioxide (CO2).

9. Hyperventilation can lead to a lowering of blood pH, referred to as metabolic acidosis.

Short Answer (5 points)

10. What is the correct path of air flow during inspiration?

**Digestive System:**

11. Which of the following statements regarding fiber is false?

a. Fiber is found mostly in plant sources

b. Fiber increases the bulk and water content of the material in the intestine

c. Fiber slows down the absorption of triglycerides

d. Fiber makes feel satisfied longer

12. All of these are enzymes that digest protein EXCEPT \_\_\_\_\_\_\_\_\_\_\_\_.

a. lipase

b. carboxypeptidase

c. pepsin

d. trypsin

13. The \_\_\_\_\_\_\_\_\_\_ secretes peptidases and disaccharidases, whereas the \_\_\_\_\_\_\_\_\_\_

secretes trypsin, chymotrypsin, amylase, lipase, and nucleases.

a. stomach, liver

b. stomach, small intestine

c. liver, small intestine

d. small intestine, pancreas

14. Which of these statements about the movement of food from the mouth to the stomach

is incorrect?

a. swallowing is a voluntary process

b. muscles of the pharynx contract to move the food to the esophagus

c. food falls down the esophagus purely by gravitational force until it reaches the stomach

d. peristalsis in the esophagus occurs in esophageal reflux

15. Most nutrient absorption takes place in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

a. duodenum and jejunum

b. stomach and duodenum

c. jejunum and ileum

d. esophagus and stomach

16. The liver, gallbladder, and pancreas are connected to ducts which enter the \_\_\_\_\_\_\_\_.

a. cecum

b. descending colon

c. duodenum

d. ileum

Short answer:

17. Compare the lining of the esophagus, stomach, small intestine and large intestine (6 points)

Fill-in the blanks:

18. What are the names of the three salivary glands? (3 points)

19. The mouth is responsible for partially digesting what type of food product?

20. The epiglottis closes over the \_\_\_\_\_\_\_\_\_\_\_to prevent food from going down the “wrong tube”.

21. What is the name of the structure in the month that is ultimately responsible for getting the epiglottis to close over the trachea?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

22. The muscular ridges on the inside of the stomach that allow the stomach to stretch when food is present are called \_\_\_\_\_\_\_\_\_\_\_\_.

23. When food is in the mouth it is called a bolus. But, when it enters the stomach and mixes with acid it is called acidic \_\_\_\_\_\_\_\_\_\_\_\_.

24. The small, finger-like projections in the small intestine are called \_\_\_\_\_\_\_.

25. When the \_\_\_\_\_\_\_\_\_\_\_\_\_\_sphincter fails to close properly, some stomach contents can enter into the esophagus. This is known as esophageal reflux.

**Immune System:**

26. Where do T-cells reach maturity?

a. bone marrow

b. tonsils

c. thymus

d. lymph nodes

27. Which of the following is only effective against bacteria?

a. lysogenic

b. lysobeam

c. lysosome

d. lysozyme

28. Which of the following cells are primarily targeted by HIV?

a. nerve cells

b. helper T-cells

c. phagocytes

d. cytotoxic T-cells

29. Which blood types could safely be given to someone with O+ blood?

a. O+ only

b. A+ and B+ only

c. O– and O+ only

d.A+, B+, and AB+ only

30. What type of immunity is responsible for agglutination of viruses?

a. passive immunity

b.cell mediated immunity

c. nonspecific immunity

d. antibody immunity

31. Which of the following best describes the immunity gained from a vaccine?

a. nonspecific

b. active

c. passive

d.artificial

32. What immune system disorder results from the immune system losing its ability to screen new lymphocytes for self-compatibility?

a. type I diabetes

b. arthritis

c. multiple sclerosis

d. lupus

Short Answer:

33. What is the primary difference between antibodies and antigen receptors? (2 points)

34. What are three **nonspecific** immune strategies? (3 points)