

Science Olympiad  
Kenston Tournament  
Div B  
Anatomy and Physiology  
January 13, 2018

**INSTRUCTIONS:**

Turn in ALL exam materials at the end of this event.

Please do not write on the QUESTION SHEET

Write your school name, team number and individual names where indicated on the ANSWER SHEET

Put your team number on EVERY page of the ANSWER SHEET

You may separate the exam pages. But, PLEASE re-clip them as you submit your materials to the event volunteers

Provide the answers in the appropriate area on the ANSWER SHEET. Answers provided outside the intended answer area may not be considered

You are free to write anywhere in the packet, but only answers in the appropriate area on the ANSWER SHEET will be counted

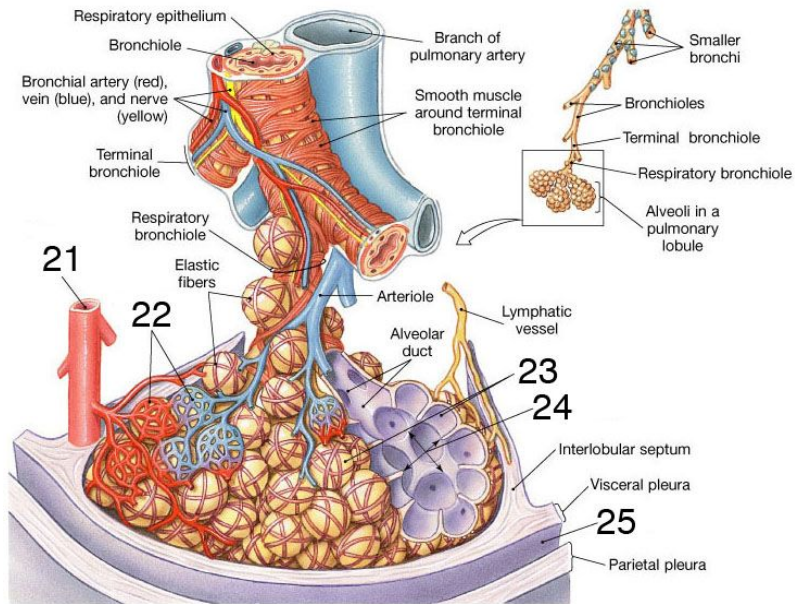
Point values for each section are indicated on the QUESTION SHEET

The tiebreakers are highlighted with an asterick(\*)

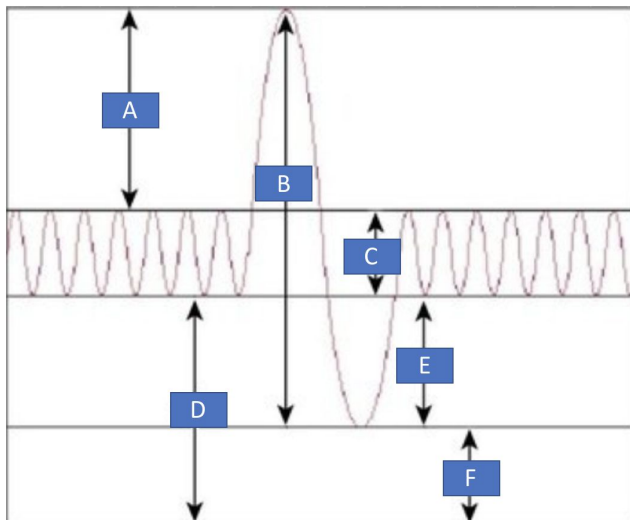
Continuing to write after the time is up will result in disqualification

1. Which of the following is a major component of immune system **(1 point)**
  - A. Spleen
  - B. Thymus
  - C. Lymph Nodes
  - D. All of the above
2. One of the important cells of immune system is **(1 point)**
  - A. Keratocytes
  - B. Oligocytes
  - C. Leukocytes
  - D. Dendrites
3. Which of the following is included in Phagocytes **(1 point)**
  - A. Neutrophils
  - B. Monocytes
  - C. Eosinophils
  - D. All of above
4. Obesity is defined as the accumulation of excess body fat leading to a \_\_\_\_\_ body mass index **(1 point)**
  - A. High
  - B. Low
  - C. No change
5. The production of antibodies is the body's \_\_\_\_\_ line of defense **(1 point)**
  - A. First
  - B. Second
  - C. Third
  - D. Fourth
6. The activity of antigens and antibodies are involved in \_\_\_\_\_ defense **(1 point)**
  - A. Specific
  - B. Nonspecific
  - C. Nonspecific barrier
  - D. None of above
7. Symptoms of allergic reaction includes **(1 point)**
  - A. watery or itchy eyes
  - B. hives
  - C. rhinitis
  - D. All of above
8. Which of the following statements is true regarding antibodies? **(2 points)**
  - A. Antibodies bind to and kill foreign cells.
  - B. Antibodies are a type of antibiotic, which kills bacteria.
  - C. Antibodies bind to foreign antigens resulting in attracting more macrophages to the foreign cells.

\*9. Identify (= name) the parts or structures labeled 21-25 (5 points)



Questions 10 - 13 apply to the following diagram:



10. Identify the functional residual capacity (1 point)

- A. A
- B. B
- C. C
- D. D
- E. E
- F. F

11. Identify the letter associated with the difference between the inspiratory capacity and inspiratory reserve volume (1 point)

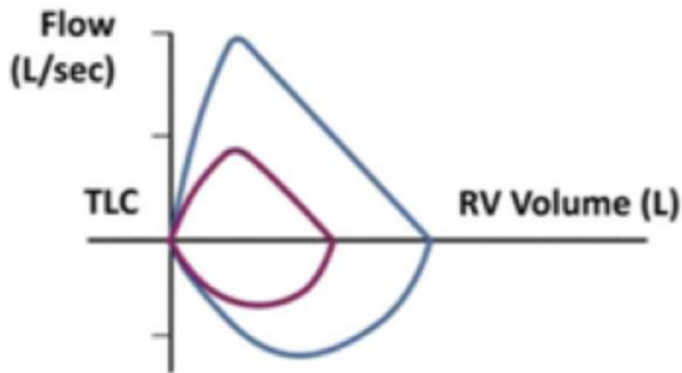
- A. A
- B. B
- C. C
- D. D
- E. E
- F. F

12. What is the value in question 34 called? (1 point)

- A. Inspiratory reserve volume
- B. Vital capacity
- C. Tidal volume
- D. Residual volume

13. In COPD, which value on the chart is increased? (1 point)

- A. A
- B. B
- C. C
- D. D
- E. E
- F. F



14. What pattern of lung disease is represented by the purple loop in this flow diagram?

**(1 point)**

- A. Obstructive
- B. Restrictive
- C. Mixed obstructive and restrictive
- D. None

For questions 15-18, match the following patterns of breathing with the cause

15. Apnea **(1 point)**

16. Kussmaul **(1 point)**

17. Cheyne-Stokes **(1 point)**

18. Tachypnea **(1 point)**

- a. Diabetic ketoacidosis
- b. 3-year-old having a temper tantrum holds his breath to get his mother's attention
- c. Marathon runner who just finished her race in record time
- d. Obstructive sleep apnea, obesity

19. The respiratory zone of the lungs includes (select all that apply) **(2 points)**

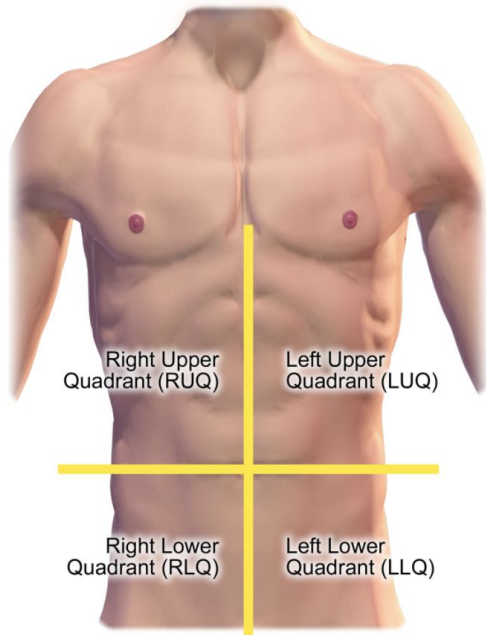
- A. Trachea
- B. Primary bronchi
- C. Terminal bronchioles
- D. Respiratory bronchioles
- E. Alveoli

20. True or false: The lungs have two blood supplies **(1 point)**

21. Which vitamins do children with cystic fibrosis need to have replaced? **(2 points)**

- A. D, A, K, E
- B. B12, B6
- C. Niacin
- D. Thiamine

The following figure applies to questions 22-24



22. Locate your appendix (1 point)

- A. RUQ
- B. LUQ
- C. RLQ
- D. LLQ

23. Locate your liver (1 point)

- E. RUQ
- F. LUQ
- G. RLQ
- H. LLQ

24. Locate your stomach (1 point)

- I. RUQ
- J. LUQ
- K. RLQ
- L. LLQ



25. Which organ is this and what is its function? **(1 point)**
- Small intestine - absorb nutrients
  - Stomach - mix contents
  - Large intestine - absorb water
  - Small intestine - absorb water
  - Stomach - absorb nutrient
26. Vitamin B<sub>12</sub> is absorbed mainly in the: **(1 point)**
- Stomach
  - Ileum
  - Colon
  - Jejunum
  - Duodenum
27. Surgical removal of the distal ileum is most likely to impair the absorption of: **(1 point)**
- Peptides
  - Sugars
  - Iron
  - Calcium
  - bile salts
28. Saliva contains the carbohydrate-digesting enzyme: **(1 point)**
- Pepsin
  - Carboxypeptidase
  - Amylase
  - Trypsin

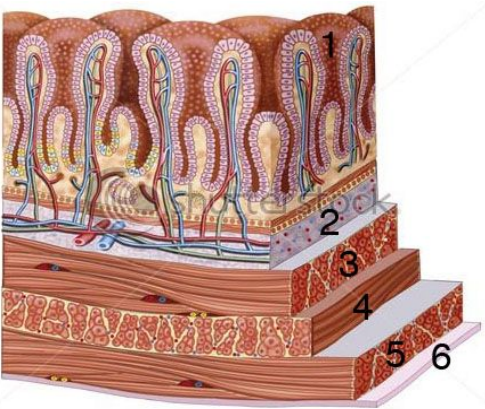
29. In a healthy human, the digestion of proteins is most likely to begin in the: **(1 point)**
- A. Jejunum
  - B. Duodenum
  - C. Stomach
  - D. Ileum
  - E. mouth
30. Which cell is properly matched with its secretion? **(1 point)**
- A. Enteroendocrine cell - trypsin
  - B. Chief cell - intrinsic factor
  - C. Parietal cell - gastrin
  - D. Enterochromaffin-like cell - histamine
31. Which of the following antibodies are involved in causing basophils to release histamine?  
**(1 point)**
- A. IgA
  - B. IgG
  - C. IgE
  - D. IgM
- \*32. HIV positive patients usually have a deficiency of **(3 points)**
- A. Zn
  - B. Mg
  - C. Ca
  - D. Vit D
33. Name the disease which exhibit the symptom as shown below **(2 points)**



- \*34. List group of cancers affecting digestive system **(5 points)**
- \*35. Which of the following drugs is used to treat HIV/AIDS (select all that apply) **(3 points)**
- A. Stavudine
  - B. Fuzeon
  - C. Zidovudine
  - D. Chloromycin



36. Following digestive problems are linked to obesity (select all that apply) **(3 points)**
- A. COPD
  - B. Hepatomegaly
  - C. Cirrhosis
  - D. Sleep Apnea
37. Appendicitis can be treated by **(1 point)**
- A. Surgery
  - B. Therapy
  - C. Exercise
  - D. None of the above
38. If you've consumed 50 grams of fat over the course of three meals and two snacks and your total intake for the day is 2000 calories, you've had a total of \_\_\_\_\_ fat calories and \_\_\_\_\_ percent of your daily calories from fat **(2 points)**
- A. 450 & 22.5
  - B. 480 & 35
  - C. 1000 & 50
  - D. 2000 & 200
39. Celiac Disease is an immune reaction to eating **(1 point)**
- A. gluten
  - B. dairy
  - C. nuts
  - D. shellfish
40. Patients with chronic hepatitis have increased risk of **(2 points)**
- A. Colon cancer
  - B. Colorectal cancer
  - C. Liver cancer
  - D. Intestinal cancer
- \*41. Identify by providing the best label/name for each. **(6 points)**



42. The respiratory system plays a role in body pH balance through what system? **(1 point)**
- A. Bicarbonate Buffer System
  - B. Sodium water System
  - C. Blood System
  - D. None of the above
43. Where do large fatty acids go after being digested in the small intestines? **(1 point)**
- A. Lacteals
  - B. Villi
  - C. Bile
  - D. Urine
44. Self-tolerance is the ability of certain immune system cells to turn off self-reactive lymphocytes to prevent autoimmune diseases, which cytotoxic immunity cell type has this ability? **(1 point)**
- A. T-Cells
  - B. B-Cells
  - C. Lymph
  - D. Red blood cells
45. When the diaphragm contracts what happens to chest cavity pressure? **(1 point)**
- A. Increase
  - B. No change
  - C. Decrease
  - D. Fluctuates
- \*46. How does the size of the left lung compare to the right and why? **(1 point)**
- A. Large
  - B. Same size
  - C. Small due to position of the heart
47. Which specific type of bond connects heavy and light chains of antibodies? **(1 point)**
- A. Disulfide
  - B. Ionic
  - C. Covalent
  - D. Hydrogen
48. What reduces surface tension at the liquid-gas interface of the alveoli? **(1 point)**
- A. Surfactant
  - B. Detergent
  - C. Salt
  - D. Buffer

49. Amoxicillin is mostly known to treat **(1 point)**
- A. AIDS
  - B. Tuberculosis
  - C. Stomach ulcer
  - D. Dermatitis
50. HIV can be transmitted via the exchange of **(1 point)**
- A. Food
  - B. Shaking hand
  - C. Body fluids
  - D. All of above
51. Transplant rejection can be prevented by \_\_\_\_\_ immune system **(1 point)**
- A. Activating
  - B. Supressing
  - C. Triggering
52. World AIDS Day is **(1 point)**
- A. Oct 1
  - B. March 1
  - C. December 1
  - D. August 1
53. In the stomach, pepsinogen is activated to become pepsin via exposure to **(1 point)**
- A. HCl
  - B. Bile
  - C. Carbon
  - D. Ca
54. High altitude can result in **(1 point)**
- A. Eczema
  - B. Sleep Apnea
  - C. Hyperoxia
  - D. Hypoxia
55. Immediate hypersensitivity reactions involve **(1 point)**
- A. IgE
  - B. IgG
  - C. IgM
  - D. IgA

\*56. Please write the full form of **(6 points)**

- A. ART
- B. BMI
- C. AIDS
- D. HPV
- E. GI
- F. COPD

57. Which of the following is true for HIV patients **(1 point)**

- A. Belly bigger than hips
- B. Hips bigger than belly
- C. Thighs bigger than hips
- D. Hips bigger than thigh

58. Peptic ulcer may be caused by **(1 point)**

- A. Fungi
- B. Virus
- C. Bacteria
- D. Microbes

59. Interferons are substances released by some cells to fight **(1 point)**

- A. Bacteria
- B. Virus
- C. Symbiotic pathogens
- D. Microbes

60. Proteins and Carbohydrates contain \_\_\_\_\_ calories **(1 point)**

- A. 4
- B. 9
- C. 5
- D. 10