NYS Science Olympiad
Regionals 2012

Anatomy and Physiology

Do Not Open This Booklet Until Instructed To Do So

REGIONAL SCIENCE OLYMPIAD
NY Regionals 2012

Name_____

School _____

Team # _____

Directions – Place all answers on the answer sheet provided. For multiple choice answers, place the letter of the correct response. If a blank line appears after the question, the question is a "fill in the blank" style question.

1. Which of the following is NOT considered an accessory organ in the process of digestion?
    a. Salivary Glands
    b. Liver
    c. Tongue
    d. Esophagus
    e. Gall Bladder

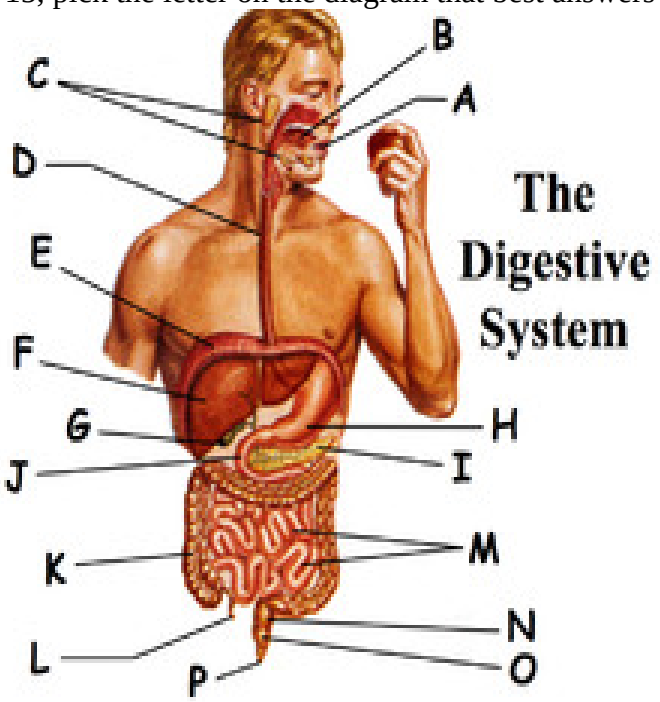
2. Which of the following is NOT a layer of the wall of the alimentary canal?
    a. Mucosa
    b. Peritoneum
    c. Serosa
    d. Muscularis
    e. Submucosa

3. Which is NOT true of the esophagus?
    a. It is where peristalsis begins
    b. It is usually where a bolus can be found
    c. It is the usual site for heartburn
    d. It contains two sphincters
    e. Only mechanical digestion occurs at this location

4. What other glands exist in the moth besides salivary glands? _____

5. Which cells are responsible for releasing gastric enzymes in the stomach?
    a. Parietal cells
    b. Enteroendocrine cells
    c. Zymogenic cells
    d. Mucous cells
    e. Chyme cells

For questions 6-15, pick the letter on the diagram that best answers the question



6. Begins the digestion of proteins.
7. Contains accessory ducts that lead directly into the small intestine.
8. Can be safely removed without any major disruption to digestion.
9. Contains 3 lobes: right, left and quadrate.
10. Major site of nutrient absorption.
11. Failure of this organ can cause diarrhea or constipation.
12. These TWO structures produce the bulk of the enzymes needed for digestion.
13. Site of the destruction of worn out red blood cells
14. Synthesizing of B and K vitamins takes place here.
15. Location of lacteals

16. The cardiac sphincter surrounds the cardiac orifice. If this sphincter failed to properly constrict, there might be a problem with _____.

    a. Regurgitation of food into the esophagus
    b. The loss of control of defecation
    c. Movement of the bolus into the trachea rather than the esophagus
    d. Rapid emptying from the stomach to the small intestine
    e. Rapid emptying from the small intestine to the large intestine

17. Bile works to physically break down fats. This process is called _____.

18. The enzyme that breaks down lactose is released in what organ? _____.

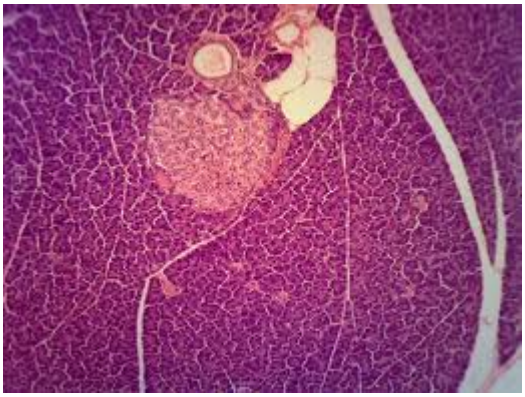
19. Your small intestine can absorb ____ without their being further digested. (

a. Starches
b. Fats
c. Proteins
d. Fructoses
e. Nucleic acids

20. Which type of ulcer occurs in the first part of the small intestine?
a. Peptic ulcers
b. Duodenal ulcers
c. Gastric ulcers
d. Lactealic ulcers
e. Bleeding ulcers

21. Which digestive disorder is characterized by jaundice? _____

22. What is the origin of the tissue in the diagram below?



a. Stomach
b. Small intestine
c. Liver
d. Pancreas
e. Tongue

23. Which of these digestive enzymes removes one amino acid at a time from the end of polypeptide chains?

a. Carboxypeptidase
b. Amylase
c. Nuclease
d. Trypsin
e. Chymotrypsin

24. Which digestive disorder can be spread by sexual contact? _____

25. Which of the following digestive enzymes has an activated and inactivated form?

    a. Lactase
    b. Amylase
    c. Pepsinogen
    d. Nuclease
    e. Aminopeptidase

26. The stomach release gastrin, GIP and cholecystokinin to aid in digestion. What are they? _____

27. Excess Carbon dioxide travels through the blood stream as what?
    a. Bicarbonate ion
    b. Deoxy-hemoglobin
    c. Myoglobin
    d. Carbonic Acid
    e. Molecular carbon dioxide

28. Which of the following respiratory organs is NOT ciliated?
    a. Nose
    b. Bronchi
    c. Pharynx
    d. Bronchioles
    e. Trachea

29. What is the Larynx primarily composed of?
    a. Smooth muscle
    b. Visceral muscle
    c. Loose connective tissue
    d. Elastin
    e. Cartilage

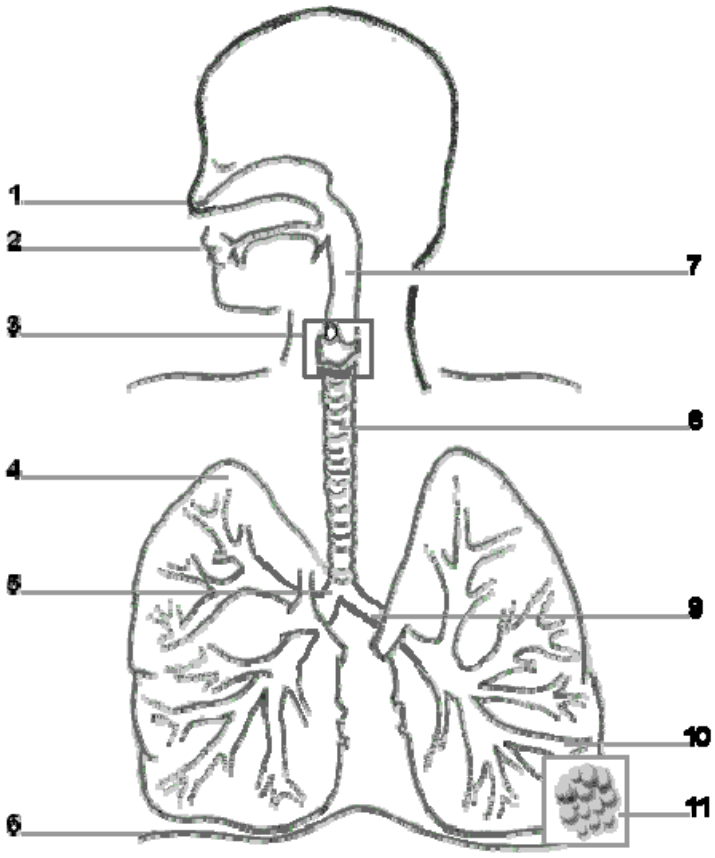
30. The thyroid cartilage is also called what? _____

31. Which disease do the lungs become permanently inflated because they have lost their elasticity? _____

32. Which disease of the reparatory system is brought on by allergic reactions?

    a. Bronchitis
    b. Cystic fibrosis
    c. Asthma
    d. Pneumonia
    e. COPD

For questions 33-42, pick the letter on the diagram that best answers the question



33. The pharnyx
34. Respiratory surface, must be kept moist
35. Consist of epithelial cells and septal cells
36. Pneumonia primarily affects this structure.
37. The diaphragm
38. The trachea
39. The larynx
40. Controls the volume of the thoracic cavity during breathing.
41. Regulates the temperature of the air we breathe.
42. These three structures are kept open by cartilaginous rings.

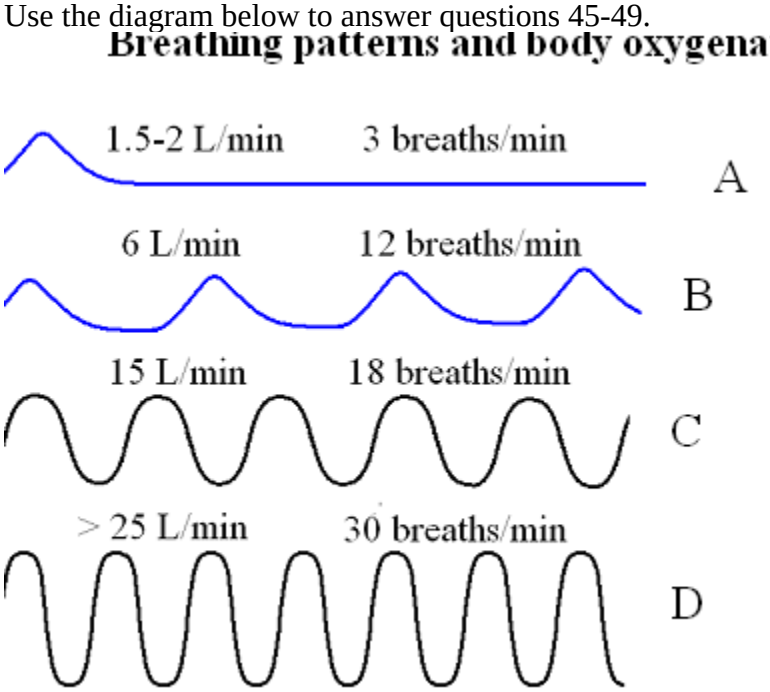
43. By picking up hydrogen ions, hemoglobin prevents the blood from becoming too _____

a. Acidic
b. Basic
c. Thick
d. Low in oxygen concentration
e. Red

44. Which type of epithelial tissue would you suppose lines the alveoli?

a. Stratified squamous epithelium
b. Simple columnar epithelium
c. Simple squamous epithelium
d. Stratified cuboidal epithelium
e. Stratified columnar epithelium

Use the diagram below to answer questions 45-49.



45. Represents an ideal breathing pattern.
46. Represents the breathing pattern of someone with asthma.
47. Represents normal ventilation.
48. Represents the breathing pattern of someone with cystic fibrosis
49. Represents the person with the largest tidal volume

50. What is the Minute ventilation of a person with a Tidal volume of 2.5 L , a respiration rate of 25 breaths per minute and a dead space volume of 0.12 L? _____

51. What is the Dead Space ventilation of the person in question #50? _____

52. What is the Alveolar ventilation of the person mentioned in question # 50? _____

53. What apparatus is used to test for COPD? _____

54. Breathing in mammals is controlled by the _____, which monitors _____.

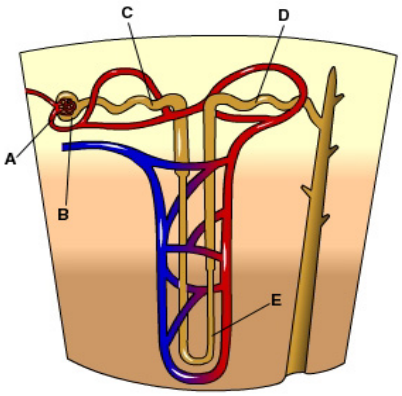
a. Hypothalamus ... blood CO2
b. Cerebellum ... blood O2
c. Hypothalamus ... blood pH
d. Thalamus ... blood O2
e. Medulla ... blood pH

55. What is the name of the branch of biology that deals with the urinary system? _____

56. The kidney's filtration process is nonselective, so _____.

a. Many valuable substances are lost in the urine
b. The proportions of the substances in urine are the same as in blood
c. Urine is much less concentrated than blood
d. Filtration really has little control over body fluid composition
e. Useful substances must be selectively reabsorbed

57. Filtrate is formed as fluid is forced through the walls of the glomerulus and, initially, collects in the structure indicated by the letter _____.



a. A
b. B
c. C
d. D
e. E

58. What is structure B ? _____

59. Which of the following is a normal characteristic of normal urine?
    a. Turbid when released and becomes transparent upon standing.
    b. Has no aroma upon standing.
    c. 1-2 Liters produced daily.
    d. 8.0 average pH
    e. Clear to pale yellow in color

60. Which of the following is not a primary component of urine?
    a. Water
    b. Creatine
    c. Urea
    d. Sodium Chloride
    e. Ammonium ion

61. Most of our nitrogen-containing waste products are a result of _____.

    a. Drug use
    b. Consumption of foods high in nitrates, such as green vegetables
    c. Protein metabolism
    d. The body's attempts to maintain pH homeostasis
    f. Metabolism of fatty foods

62. Renal failure is caused by a decrease or cessation of what filtrate? _____

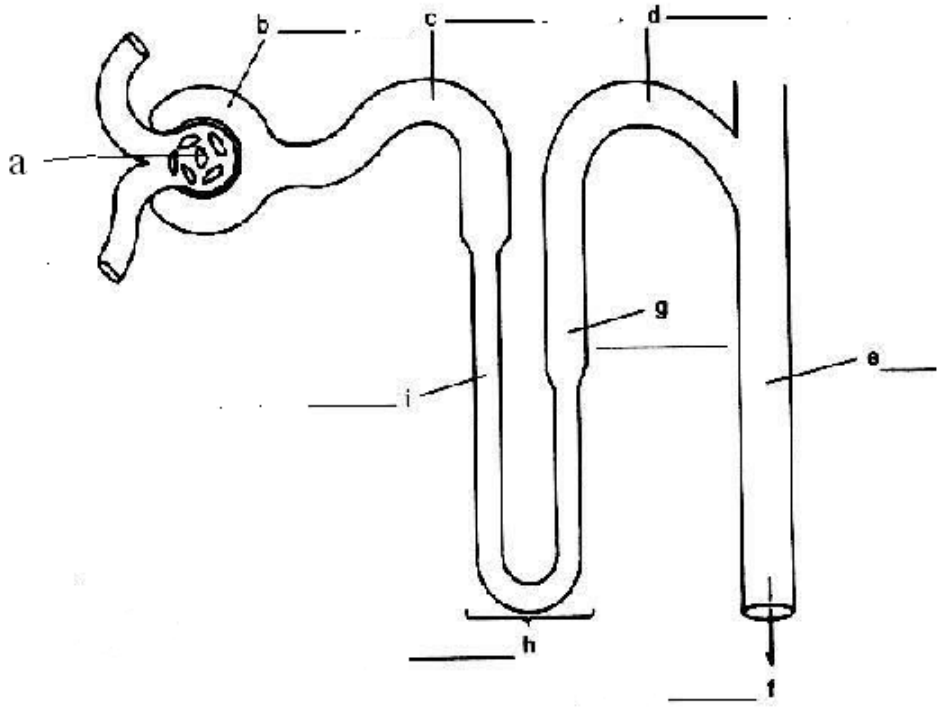
63. UTI's can cause which of the following?
    a. Urethritis
    b. Cystitis
    c. Pylonephritis
    d. Septic shock
    e. All are associated with UTI's.

64. The inner portion of the kidney is called?
    a. Renal medulla
    b. Renal Sinus
    c. Renal Cortex
    d. Renal Fascia
    e. Renal Hilus

65. Which is true of the urinary bladder?
    a. When empty the walls are thinner
    b. As urine volume increases it takes on a pear shape.
    c. It is posterior to the rectum
    d. In females it is posterior to the vagina
    e. It is directly connected to the kidneys

66. What endocrine gland releases ADH? _____

For questions 67-76, refer to the following diagram.



67. The Glomerulus
68. The descending limb of the Loop of Henle.
69. The distal convoluted tubule
70. The collecting tubule
71. Bowman's capsule
72. The proximal convoluted tubule
73. Major site of reabsorption of NaCl
74. The urine becomes progressively more dilute.
75. Reabsorption of 90% of bicarbonate ion.
76. Made entirely of capillaries

77. Which of the following correctly describes a case of osmoregulation?

a. Body fluids are isoosmotic with their environment
b. Secretion of drugs and reabsorption of nutrients by the proximal tubule.
c. Excretion of salt in a hypoosmotic environment
d. Discharge of excess water in a hypoosmotic environment
e. Expenditure of energy to convert ammonia into less toxic waste

78. What hormone increases blood pressure and causes a re aborption of more NaCl?

_____

79. What connects each kidney to the urinary bladder? _____

80. What other nitrogenous waste makes up a small component of urine? _____

TIE BREAKERS

1. Which law says that the quantity of gas that dissolves ion a liquid is proportional to the partial pressure and a solubility coefficient?

2. Which digestive disorder can sometimes follow gastric surgery?

3. What is the general term for low level of oxygen availability?

4. Any temporary cessation of breathing is called what?

5. The saturation of what plummets at high altitudes?