

## Anatomy and Physiology Aviation Invitational December 2017

### True/False

ANSWER ALL QUESTIONS (except short answer) on SCANTRON  
INCLUDE TEAM NAME/NUMBER ON SCANTRON FORM

Indicate whether the statement is true or false.

- \_\_\_ 1. Tracheal rings are made of hyaline cartilage.
- \_\_\_ 2. The main function of the lymphatic system is to trap and retain infectious agents and present them to cells in the immune system.
- \_\_\_ 3. In humans, glucose can be stored as glycogen.
- \_\_\_ 4. The large intestine is called “large” because it is longer and bigger than the small intestine.

### Multiple Choice

ANSWER ALL QUESTIONS (except short answer) on SCANTRON  
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Identify the choice that best completes the statement or answers the question.

5. The function of the respiratory tract cilia is to:

a.	move dirty mucous toward the throat to be swallowed
b.	absorb dust and particles that enter the respiratory tract
c.	signal respiratory cells there is a flow of mucous
d.	exchange carbon dioxide for oxygen

6. The tidal volume (TV) is

a.	The volume of air inspired in a regular breath
b.	The maximum amount of air that can be inspired after inhaling normally
c.	The maximum amount of air expired after exhaling normally
d.	The amount of air left in the respiratory passages after maximum exhalation

7. Hypoxia refers to:

a.	Hyperventilation	c.	Inflammation of the lungs
b.	Inadequate oxygen supply at the tissue level	d.	Bleeding from the nose

8. The epithelium lining the nasal cavity is:

a.	Transitional epithelium with goblet cells	c.	Olfactory epithelium
b.	Squamous ciliated epithelium without goblet cells	d.	None of the above

9. A foreign molecule that can cause an immune response is referred to as an:

a.	haptan	c.	t-cell
b.	antigen	d.	antibody

10. Disease resulting from inability to recognize self from non-self is called

a.	immunodeficiency	c.	anaphylaxis
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b.	allergy	d.	autoimmune
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11. Which of these is not a surface barrier to invading microorganisms?

a.	skin secretions	c.	tears
b.	saliva	d.	pyrogen

12. Plasma cells produce

a.	complement proteins	c.	prostaglandin
b.	hemoglobin	d.	antibodies

13. Which of the following is a natural killer cell?

a.		c.	
b.			

14. Which of these immune cells is responsible for the histamine response?

a.	Mast Cell	c.	basophil
b.	Plasma Cell	d.	eosinophil

15. A bacteria or foreign protein that causes the body to produce antibodies is referred to as:

a.	a virus	c.	an antigen
b.	a chromosome	d.	complement

16. Which enzyme is contained in saliva to destroy bacteria?

a.	amylase	c.	lysozyme
b.	peptidase	d.	prostaglandin

17. Vaccinations work by causing

a.	natural passive immunity	c.	artificial passive immunity
b.	inflammation	d.	artificial active immunity

18. What is this structure?

a.	chromosome	c.	antibody
b.	plasma cell	d.	histocompatibility complex

19. Bile is produced in the

a.	liver	c.	stomach
b.	pancreas	d.	large intestine

20. During digestion, protein is broken down into

a.	fatty acids	c.	amino acids
b.	glucose	d.	lipids

21. Which is the first part of the small intestine?

a.	Ileum	c.	Jejunum
b.	Duodenum	d.	Esophagus

22. Which organ secretes the digestive enzymes amylase and lipase into the duodenum and produces insulin?

a.	liver	c.	gallbladder
b.	pancreas	d.	stomach

23. The folds in the stomach that expand to accommodate food are known as the:

a.	Uvula	c.	Appendix
b.	Rugae	d.	Pylorus

24. Hydrochloric acid in the stomach is produced by which cells?

a.	goblet cells	c.	HCL cells
b.	endothelial cells	d.	parietal cells

25. The action of the gastrointestinal system that causes movement of food is called

a.	swallowing	c.	segmentation
b.	propulsion	d.	preistalsis

26. The falciform ligament separates the \_\_\_\_\_ from the \_\_\_\_\_ side of the liver.

a.	right/left	c.	anterior/posterior
b.	dorsal/ventral	d.	caudate/pyloric

27. What type of cell acts as an intermediary between humoral and cell-mediated immunity

a.	plasma cell	d.	helper T cell
b.	cytotoxic T cell	e.	macrophage
c.	B cell		

28. An immune response to a specific antigen generates the production of which type of cell that launches an attack the next time that same antigen infects the body?

a.	effector cells	d.	B cells
b.	memory cells	e.	antibodies
c.	T cells		

29. If you hadn't eaten for several hours, which hormone would be responsible for returning your glucose levels to the set point?

a.	insulin	c.	liver
b.	glucagon	d.	pancreas

30. Which of the following statements is not true?

a.	An antibody has more than one antigen-binding site
b.	An antigen can have different epitopes
c.	A pathogen makes more than one antigen
d.	A lymphocyte has receptors for multiple different antigens

To protect U.S. soldiers serving overseas, each soldier receives vaccinations against several diseases, including smallpox, before deployment. Following intelligence about an imminent smallpox threat, the Army wants to ensure that soldiers stationed in Iraq are fully protected from exposure to the disease, so all the soldiers in the threat zone are given a second vaccination against smallpox.

31. The first vaccination provides immunity because

a.	a localized inflammatory response is initiated
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b.	the vaccine contains manufactured antibodies against smallpox
c.	antigenic determinants in the vaccine activate B cells, which form plasma cells as well as memory cells
d.	the vaccine contains antibiotics and other drugs that kill the smallpox virus.

32. The second vaccination is beneficial because

a.	it contains plasma cells that survive longer than 4-5 days
b.	it stimulates production of a higher concentration of antibodies in the bloodstream
c.	it requires two injections to stimulate antibody formation
d.	it keeps previously produced plasma cells circulating in the bloodstream

33. After ingestion by humans, the first category of macromolecules to be chemically digested by enzymes in the mouth is

a.	proteins.	d.	nucleic acids.
b.	carbohydrates.	e.	minerals.
c.	cholesterol and other lipids.		

34. Examine the digestive system structures in the figure above. The agents that help emulsify fats are produced in

a.	1	d.	8
b.	2	e.	9
c.	3		

35. Examine the digestive system structures in the figure above. The highest rate of nutrient absorption occurs at location(s)

a.	3 only	d.	3 and 4
b.	4 only	e.	1, 3 and 4
c.	1 and 4		

36. Examine the digestive system structures in the figure above. Most of the digestion of fats occurs in section(s)

a.	3 only	d.	3 and 4
b.	4 only	e.	1, 3 and 4
c.	1 and 4		

37. Examine the digestive system structures in the figure above. Bacteria that produce vitamins as products are residents of location

a.	3	d.	7
b.	4	e.	8
c.	5		

38. The mammalian trachea and esophagus both connect to the

a.	large intestine.	d.	rectum.
b.	stomach.	e.	epiglottis.
c.	pharynx.		

39. If you were to jog 1 km a few hours after lunch, which stored fuel would you

probably tap?

a.	muscle proteins	c.	fat stored in the liver
b.	muscle and liver glycogen	d.	fat stored in adipose tissue

40. Air rushes into the lungs of humans during inhalation because

a.	the rib muscles and diaphragm contract, increasing the lung volume.
b.	the volume of the alveoli increases as smooth muscles contract.
c.	gas flows from a region of lower pressure to a region of higher pressure.
d.	pulmonary muscles contract and pull on the outer surface of the lungs.
e.	a positive respiratory pressure is created when the diaphragm relaxes.

41. As a person goes from rest to full-effort exercise, there is an increase in the

a.	tidal volume.
b.	vital capacity.
c.	residual volume.
d.	total lung capacity.
e.	All of the above would be different.

42. Breathing is usually regulated by

a.	erythropoietin levels in the blood.
b.	the concentration of red blood cells.
c.	hemoglobin levels in the blood.
d.	CO <sub>2</sub> and O <sub>2</sub> concentration and pH-level sensors.
e.	the lungs and the larynx.

43. If a molecule of CO<sub>2</sub> released into the blood in your left toe is exhaled from your nose, it must pass through all of the following except

a.	the pulmonary vein.	d.	the right atrium.
b.	an alveolus.	e.	the right ventricle.
c.	the trachea.		

44. Food is prevented from entering the trachea by the

a.	pharynx	d.	glottis
b.	larynx	e.	sphincter muscle.
c.	epiglottis		

\_\_\_\_\_ 45. An individual's humoral response to a particular antigen differs depending on whether or not the individual has been previously exposed to that antigen. Which of the following graphs properly represents the humoral immune response when an individual is exposed to the same antigen more than once?

a.		c.	
b.		d.	

All cells have protein markers on their membranes, and the Rh antigen is found in the membranes of red blood cells. If a person possesses the Rh antigen on his or her red blood cells, it is indicated with a + sign. If a person does not possess the Rh antigen, it is indicated with a — sign. A, B, and O refer to the ABO blood groups.

**Figure 35.3**

\_\_\_\_\_ 46. Study the table in Figure 35.3. The mother could exhibit an anti-Rh factor reaction to the developing fetus in

a.	Case 1 only.
b.	Case 3 only.
c.	Cases 1 and 2 only.
d.	Cases 1, 2, and 3.
e.	It cannot be determined from the data given.

\_\_\_\_\_ 47. Study the table in Figure 35.3. Giving the mother anti-Rh antibodies before delivering her baby would be a wise precaution in:

a.	Case 1 only.
b.	Case 3 only.
c.	Cases 1 and 2 only.
d.	Cases 1, 2, and 3.
e.	It cannot be determined from the data given.

An otherwise healthy student in your class is infected with EBV, the virus that causes infectious mononucleosis. The same student had already been infected when she was a child, at which time she had merely experienced a mild sore throat and swollen lymph nodes in her neck. This time, although infected, she does not get sick.

\_\_\_\_\_ 48. Her immune system's recognition of the second infection involves the

a.	helper T cells.	d.	cytotoxic T cells.
b.	memory B cells.	e.	natural killer cells.
c.	plasma cells.		

49. The EBV antigen fragments will be presented by the virus-infected cells along with

a.	complement.	d.	class I MHC molecules.
b.	antibodies.	e.	dendritic cells.
c.	class II MHC molecules.		

**TIE BREAKERS (Short Answer): Answer these questions on this sheet. All short answer questions are used only for tie breakers, in the order listed.**

50. Physiologically, what are hiccups? \_\_\_\_\_

51. What is the function of the pleural fluid? \_\_\_\_\_

52. In which organ do t-cells mature? \_\_\_\_\_

53. Name one function of the spleen: \_\_\_\_\_