

# SOUTH PLAINS MATH & SCIENCE COMPETITION

## ANATOMY & PHYSIOLOGY

### General Information:

- Check to see that you have written your name on the label and that the test name on the label matches the name on this booklet.
- **DO NOT** open the test booklet and **DO NOT** start until the proctor says "begin."
- Each individual exam period will be 45 minutes and each exam contains 40 multiple choice questions.
- Students are allowed to use a non-programmable battery operated calculator during the individual and team exams.
- Students are encouraged to write on the exam booklet. Scratch paper and pencils will also be provided.
- Students will not be permitted to leave the test room while the test is in progress. If a student finishes early, he/she must remain in the test room until the exam period is completed.
- If you need to ask a question during the test, raise your hand and the proctor will come to you.
- There is no penalty for skipping a problem. The exam scores will be determined by the number of correct answers. All ties will be broken by awarding the place to the contestant who has the most consecutive correct answers before a problem is missed.
- **Students may NOT keep the test booklet.**

## ANATOMY & PHYSIOLOGY

1. Which of the following would NOT normally be found in the urine?
  - a. ammonia
  - b. hemoglobin
  - c. creatine
  - d. urea
  
2. The special type of epithelium found in the bladder is
  - a. stratified cuboidal
  - b. pseudostratified columnar
  - c. transitional
  - d. simple squamous
  
3. The kidneys are located in the
  - a. upper thoracic region
  - b. lower thoracic region
  - c. lower lumbar region
  - d. upper lumbar region
  
4. The hormones oxytocin and ADH
  - a. are produced by cells in the posterior pituitary
  - b. are produced by neurosecretory cells in the hypothalamus
  - c. are functionally tropic hormones from the anterior pituitary
  - d. are stored in the hypothalamus
  
5. Fight or flight responses are attributed to the sudden release of which hormone?
  - a. aldosterone
  - b. cortisol
  - c. insulin
  - d. epinephrine
  
6. Which vessel is responsible for delivery of blood directly to the nephron?
  - a. cortical arteriole
  - b. juxtamedullary arteriole
  - c. afferent arteriole
  - d. efferent arteriole
  
7. During childhood, which endocrine gland influences the maturation of a population of white blood cells called T lymphocytes that are important in the immune response?
  - a. thymus
  - b. pancreas
  - c. thyroid
  - d. thalamus

8. The urea that is lost in the urine is
- an end product of protein breakdown
  - an end product of fat breakdown
  - an end product of creatine breakdown
  - an end product of carbohydrate breakdown
9. Most reabsorption takes place in the
- loop of Henle
  - distal tubule
  - glomerulus
  - proximal convoluted tubule
10. Which of the following is an enzyme that is released in response to low blood pressure?
- ADH
  - erythropoetin
  - renin
  - aldosterone
11. The reticular activating system
- is the emotional center in the brain
  - is involved in vision and hearing
  - controls sleep/waking cycles
  - produces hormones
12. Functionally, neurons which take messages from receptors to the CNS are called
- efferent or motor neurons
  - interneurons or accessory neurons
  - sensory or afferent neurons
  - proprioceptors
13. The ANS or autonomic nervous system is divided into
- voluntary and involuntary divisions
  - sympathetic and parasympathetic divisions
  - somatic and motor divisions
  - afferent and efferent divisions
14. The area of the brain which controls the conscious control of skeletal muscles is the
- primary motor area
  - postcentral gyrus
  - cerebellum
  - pyramidal tracts
15. The area of the brain which controls fluid movement of skeletal muscle and balance is the
- primary motor area
  - postcentral gyrus
  - cerebellum
  - pyramidal tracts

16. The peripheral nervous system is made up of
- Schwann cells and oligodendrocytes
  - spinal and cranial nerves
  - brain and spinal cord
  - afferent neurons and interneurons
17. The spinal cord functions
- as a major reflex center and provides a pathway to and from the brain
  - as the center for sensory neuron function
  - in coordinating sensory and motor aspects of the body
  - as a center for gray matter
18. Sensory information comes into the CNS over
- ventral roots
  - dorsal roots
  - ventral rami
  - the lateral horn of the gray matter in the spinal cord
19. The brain stem is made up of all but the
- medula oblongata
  - pons
  - hypothalamus
  - midbrain
20. Most cerebrospinal fluid is located in
- the central canal of the spinal cord
  - the choroid plexus
  - the ventricles of the brain and subarachnoid space
  - the neurons of the cerebral cortex
21. The average size of the human heart is
- 4 lbs
  - less than 1 lb
  - 2 lbs
  - more than 4 lbs
22. Arteries differ from veins in that
- they carry blood away from the heart
  - all the blood is oxygenated
  - they carry blood to the heart
  - more of the blood is located in the arteries
23. The ventricles are
- the discharging chambers
  - thinner walled than the atria
  - the receiving chambers
  - smaller than the atria

24. Capillaries

- a. have a diameter of approximately .5mm
- b. have walls composed of just tunica intima
- c. are long vessels
- d. none of the above

25. Veins

- a. have valves that prevent backward blood flow
- b. are usually only partially filled with blood
- c. have thicker walls than arteries
- d. a and b

26. The coronary arteries

- a. supply the myocardium with oxygen
- b. lead toward the heart from the body
- c. lead from the atrium to the ventricle
- d. lead away from the heart

27. Which of the following is not a formed element of blood?

- a. platelets
- b. plasmas
- c. red blood cells
- d. leukocytes

28. A clot that breaks free from the vessel wall and floats free in the bloodstream is called

- a. thrombus
- b. embolus
- c. coagulate
- d. none of the above

29. All formed elements arise from a common type of stem cell called a

- a. erythropoietin
- b. platelet
- c. hematopoiesis
- d. hemocytoblast

30. The mitochondria in cardiac muscle fill what percentage of cell volume?

- a. 10%
- b. 20-30%
- c. 30-40%
- d. 15%

31. An enzyme is biological \_\_\_\_\_ that speeds up the rate of a reaction.

- a. ion
- b. suspension
- c. catalyst
- d. steroid

32. When two compounds or elements combine to form a new compound, it is a

- a. decomposition reaction
- b. synthesis reaction
- c. exchange reaction

33. Acids

- a. cause pH to go up
- b. release hydroxyl ions in water
- c. release hydrogen ions in water
- d. turn pH paper blue

34. The rate of chemical reactions is influenced by

- a. concentration of reactants
- b. temperatures
- c. enzymes
- d. all of the above

35. A peptide bond joins

- a. carbohydrates
- b. lipids
- c. proteins
- d. nucleic acids

36. The usable form of energy for most cells is

- a. DNA
- b. ATP
- c. fatty acids
- d. nucleic acids

37. The stage of mitosis when cytoplasm is divided is called

- a. anaphase
- b. prophase
- c. cytokinesis
- d. interphase

38. Which transport medium is responsible for moving glucose into the cell?

- a. diffusion
- b. facilitated diffusion
- c. active transport
- d. osmosis

39. Phagocytosis is

- a. the transport of material across the nuclear membrane
- b. the secretion of substances from the cell
- c. the passage of water outside the cell
- d. the enclosing of large external particles into the cell

40. The plasma membrane of a cell is composed of

- a. phospholipid molecules
- b. cholesterol molecules
- c. protein molecules
- d. all of the above

**End of Test**