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Student ID: \_\_\_\_\_

**University of Ottawa**  
**ANP1105C: Human Anatomy and Physiology I. Fall 2017**  
Professors: W. Staines and J. Savory  
**Midterm 1**  
Friday, October 6<sup>th</sup>, 2017

Exam time: 1 hour, 20 minutes

- 1) 50 multiple choice questions (1 mark/1 correct answer per question), 1 bonus multiple choice question (1 mark) plus 12.5 marks worth of diagram- labeling, matching and short answer questions.
- 2) Please answer the multiple choice questions on the computer sheet that is provided and answer the remaining questions right on the exam.
- 3) Please put your name and student number at the top of this page, on the top of page 9 and on the computer sheet. **Hand in everything when you have finished.**
- 4) Write the following words 'Version ROCK' on the front of your computer sheet!!
- 5) Make sure this exam is complete. This exam contains 10 pages **and is printed double-sided.** The excuse of missing a page will not be accepted after the examination.

1. Peripheral proteins are:
- A. proteins that are attached to integral membrane proteins (usually on the internal side of plasma membrane)
  - B. proteins of the extracellular matrix that bind to the plasma membrane
  - C. proteins of the plasma membrane that contact both the interstitial fluid and the cytoplasm
  - D. proteins of the extracellular matrix that don't interact with the plasma membrane
2. The function of cholesterol in the plasma membrane is to
- A. increase membrane fluidity (make it less rigid)
  - B. stabilize the cell membrane while decreasing the mobility of the phospholipids
  - C. make the inside of the cell negative with respect to the outside
  - D. act as an energy store for nerve and muscle activity
3. Which of the following is a characteristic of a graded potential?
- A. It is produced at axon hillock
  - B. It is all-or-none
  - C. The current decreases with distance travelled
  - D. It always induces membrane hyperpolarization
4. The Na<sup>+</sup>/K<sup>+</sup> ATPase:
- A. pumps 3 Na<sup>+</sup> ions outside the cells and 2 K<sup>+</sup> ions inside.
  - B. pumps 3 Na<sup>+</sup> ions outside the cell and 3 K<sup>+</sup> ions inside.
  - C. pumps 3 Na<sup>+</sup> ions inside the cell and 2 K<sup>+</sup> ions outside.
  - D. pumps 2 Na<sup>+</sup> ions inside the cell and 3 K<sup>+</sup> ions outside.
5. Secondary active transport relies directly on
- A. the concentration gradient for glucose
  - B. the hydrolysis of ATP
  - C. the resting membrane potential
  - D. the concentration gradient for Na<sup>+</sup>
6. In an axon, newly synthesized proteins move due to
- A. retrograde transport
  - B. anterograde transport
  - C. carrier mediated Transport
  - D. action potentials
7. Which of the follow statements about the membrane potential is/are true?
- A. In their resting state, all body cells exhibit a resting membrane potential.
  - B. The resting membrane potential occurs due to active transport of ions across the membrane due to the sodium-potassium pump.
  - C. The resting membrane potential is determined mainly by the concentration gradients and differential permeability of the plasma membrane to K<sup>+</sup> and Na<sup>+</sup> ions.
  - D. All of the above are true
8. Action potential travel down the axon is associated with:
- A. graded potentials
  - B. chemically gated ion channels
  - C. hyperpolarization
  - D. voltage-gated sodium channels

9. Dendrites:

- A. conduct action potentials away from the cell body
- B. are the site of neurotransmitter release
- C. are generally long and unbranched
- D. produce only graded potentials

10. The area on axon between two Schwann cell sheaths is the:

- A. Nissl body
- B. soma
- C. node of Ranvier
- D. axon hillock

11. Which of these features does not distinguish neurons from most other cells?

- A. Extreme longevity
- B. Amitotic (they don't divide)
- C. High metabolic rate
- D. Negative potential across the plasma membrane

12. White matter in the brain looks white because of the many

- A. synapses
- B. astrocytes
- C. neuronal cell bodies
- D. processes of oligodendrocytes

13. Creatine phosphate functions in the muscle cell by

- A. forming a temporary chemical compound with myosin
- B. forming a chemical compound with actin
- C. storing energy that will be transferred to ADP to resynthesize ATP
- D. inducing a conformational change in the myofilaments

14. What is the role of tropomyosin in skeletal muscles?

- A. Tropomyosin serves as a contraction inhibitor by blocking the myosin binding site on the actin molecules
- B. Tropomyosin serves as a contraction inhibitor by blocking the actin binding site on the myosin molecule
- C. Tropomyosin is the chemical that activates the myosin head
- D. Tropomyosin is the receptor for the motor neuron transmitter

15. The major function of the sarcoplasmic reticulum in muscle contraction is to:

- A. make and store creatine phosphate
- B. synthesize actin and myosin myofilaments
- C. provide a source of myosin for the contraction process
- D. regulate intracellular calcium concentrations

16. Skeletal muscle tissue has all the properties except

- A. secretion
- B. excitability
- C. contractility
- D. extensibility

17. The function of myoglobin is to:

- A. serve as an intracellular reservoir for oxygen for aerobic respiration
- B. bind actin to shorten myofibrils
- C. block the myosin binding sites on thin filaments
- D. store ATP

18. What is the role of calcium ions in muscle contraction?

- A. To form hydroxyapatite crystals
- B. To reestablish glycogen stores
- C. To bind to regulatory sites on troponin to remove contraction inhibition
- D. To increase levels of myoglobin

19. Of the following muscle types, which has only one nucleus, no sarcomeres, and has gap junctions?

- A. Voluntary muscle
- B. Smooth muscle
- C. Cardiac muscle
- D. Skeletal muscle

20. What part of the sarcolemma contains acetylcholine receptors?

- A. The motor end plate
- B. The end of the muscle fiber
- C. The part adjacent to another muscle cell
- D. Any part of the sarcolemma

21. Which of the following statements is most accurate?

- A. Muscle tension remains relatively constant during isotonic contraction.
- B. T tubules may be sliding during isotonic contraction.
- C. The I band lengthens during isotonic contraction.
- D. Myofilaments slide during isometric contractions.

22. Which of the following statements concerning the resting membrane potential is TRUE?

- A.  $\text{Na}^+$  tends to diffuse out of the cell.
- B. The resting membrane potential exists because the cell membrane is more permeable to  $\text{Cl}^-$  than it is to  $\text{K}^+$ .
- C.  $\text{K}^+$  tends to diffuse out of the cell.
- D. The cell membrane is more permeable to  $\text{Na}^+$  than to  $\text{K}^+$ .

23. Phospholipids

- A. line the intracellular surface of the plasma membrane
- B. line both the intracellular and extracellular surfaces of the plasma membrane
- C. represent a barrier to diffusion of most substance across the plasma membrane
- D. Both A and C are correct

24. Some functions of plasma membrane proteins are

- A. transport
- B. receptors for signal transduction
- C. enzyme activity
- D. all of the above

25. In carrier mediated transport
- A. membrane proteins assist in solute (dissolved molecules) diffusion down their concentration gradient
  - B. membrane proteins assist in solute (dissolved molecules) diffusion against their concentration gradient
  - C. require ATP to permit solute (dissolved molecules) diffusion down their concentration gradient
  - D. require ATP to permit solute (dissolved molecules) diffusion against their concentration gradient
26. In a CNS neuron action potentials are generated
- A. at the post synaptic membrane
  - B. in the neuronal dendrites
  - C. at the axon hillock (initial segment)
  - D. in the nerve terminal.
27. The key(s) to changes in the membrane potential away from the resting membrane potential are
- A. ligand gated ion channels
  - B. voltage gated ion channels
  - C. receptor gated ion channels
  - D. All of the above
28. The resting membrane potential is characterized by
- A. the cytoplasm contains more  $K^+$  and less  $Na^+$  than does the extracellular fluid.
  - B. a charge separation exists at the plasma membrane.
  - C. the membrane is more permeable (leaky) to  $K^+$  than to  $Na^+$ .
  - D. All of the above
29. The relative refractory period of the action potential results from
- A. slow closure of the voltage gated sodium channels
  - B. slow closure of the voltage gated potassium channels
  - C. activation of acetylcholine receptors
  - D. the presence of myelination on the axon
30. The release of neurotransmitters at the nerve terminal depends on
- A. voltage dependent sodium channels
  - B. voltage dependent calcium channels
  - C. neurotransmitter vesicle release
  - D. Both B and C
31. Activation of the motor end plate leads to contraction because of
- A. excitatory postsynaptic potential at the motor end plate
  - B. action potential along the sarcolemma
  - C. release of  $Ca^{++}$  from the sarcoplasmic reticulum
  - D. All of the above
32. A motor unit is defined as
- A. the group of neurons in the motor cortex required for movement
  - B. the group of neurons in the spinal ventral horn required for movement
  - C. a motor neuron in the spinal ventral horn and all of the muscle cells it innervates
  - D. all of the muscle cells the coordinate to produce a muscle movement

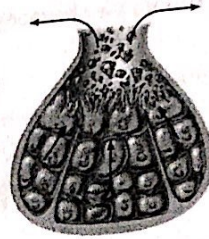
33. The basis of the latent period of excitation-contraction coupling is
- A. slow axonal conduction along unmyelinated axons
  - B. the slow reactivity of myosin ATPase in some fiber types
  - C. the diffusion of  $Ca^{++}$  after being released from the sarcoplasmic reticulum
  - D. the rate of  $Ca^{++}$  reuptake into the sarcoplasmic reticulum
34. A structure that is composed of two or more tissues would be:
- A. a complex tissue
  - B. an organ system
  - C. an organ
  - D. a complex cell
35. The suffix "cyte" in a cell name indicates a(n):
- A. cell that is part of the stroma of an organ
  - B. cell that has ruptured
  - C. mature cell with reduced capacity for cell division
  - D. cell that is part of an exocrine gland
  - E. immature cell that can still divide
36. Which of the following is avascular?
- A. adipose
  - B. cardiac muscle
  - C. stratified squamous epithelial
  - D. bone
  - E. skeletal muscle
37. The primary blast cell for connective tissue proper is the \_\_\_\_\_.
- A. osteoblast
  - B. chondroblast
  - C. hemocytoblast
  - D. fibroblast
  - E. macrophage
38. What type of connective tissue prevents muscles from pulling away from bones during contraction?
- A. dense irregular connective tissue
  - B. dense regular connective tissue
  - C. areolar connective tissue
  - D. elastic connective tissue
  - E. hyaline cartilage
39. What feature characterizes simple columnar epithelium of the digestive tract?
- A. a rich vascular supply
  - B. fibroblasts
  - C. cilia
  - D. dense microvilli

40. All of the following are true for epithelial tissues EXCEPT:

- A. there is little extracellular space between adjacent plasma membranes
- B. they attach to connective tissue via a basement membrane
- C. they have a rich blood supply
- D. they have a high rate of cell division
- E. they have a nerve supply

41. Sebaceous glands are example of:

- A. holocrine glands
- B. merocrine glands
- C. endocrine glands
- D. apocrine glands



42. Place the following in correct sequence from simplest to most complex: (1) molecules, (2) atoms, (3) tissues, (4) cells, (5) organ

- A. 1-2-3-4-5
- B. 2-1-4-3-5
- C. 2-1-3-4-5
- D. 1-2-4-3-5

43. The term \_\_\_\_\_ refers to the fact that an epithelial tissue has only one layer of cells.

- A. stratified
- B. cuboidal
- C. simple
- D. pseudostratified

44. Peroxisomes \_\_\_\_\_

- A. are also called micro bodies and contain hydrolases
- B. are able to detoxify substances by enzymatic action
- C. functions to digest particles ingested by endocytosis
- D. sometimes functions as secretory vesicles

45. Which statement best describes connective tissue

- A. It contains a large amount of matrix
- B. It is always arranged in a single layer of cells
- C. It is primarily concerned with secretion
- D. It usually lines body cavities

46. The gland type that secretes its product continuously, by exocytosis is:

- A. merocrine
- B. holocrine
- C. endocrine
- D. apocrine

47. Which kind of CT acts as a sponge, soaking up fluid when edema occurs?

- A. areolar CT
- B. reticular CT
- C. adipose CT
- D. vascular tissue
- E. dense irregular CT

48. Where do endocrine glands secrete their hormones?

- A. Onto skin
- B. Into the extracellular matrix
- C. Into the bloodstream
- D. Into ducts

49. The primary purpose of stratification, or layering, in epithelial tissue is for increased \_\_\_\_\_.

- A. protection
- B. secretion
- C. absorption
- D. thickening of the basement membrane

50. There are four primary types of tissues; they are

- A. epithelial, cartilage, muscular and brain
- B. connective, epithelial, skin and blood
- C. epithelial, connective, muscular and nervous
- D. glands, bone, lungs and kidneys

**Bonus question**

51. According to the course syllabus, the penalty for late submission for Mastering A&P assignments is

- A. 10% of your mark for the late assignment
- B. 2% for every hour late
- C. 2% off your final overall mark for the assignments
- D. Late submissions are automatically given a mark of 0

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