STUDENT NAME: ……..

STUDENT NUMBER: ……..

University of Ottawa

ANP 1105D

Midterm #1

Date: February 1, 2010

Duration: 1 hr 20 min

Instructor: Joanna Komorowski

INSTRUCTIONS:

1. 52 multiple choice questions (1 mark/1 correct answer per question) plus one BONUS question
2. Please answer the multiple choice questions on the computer sheet that is provided
3. Please **put your name and student number at the top of this page** and at the top of the final page. **Please do not forget to put your course code (ANP 1105D), your surname (last name) and the initials, on the first page of the scantron sheet!!!**
4. Make sure this exam is complete. This exam contains 11 pages.
5. The excuse of missing a page will not be accepted after the examination.

Good luck!!!!

1. Mitochondria:

A. are involved in the breakdown of ATP
B. contain some DNA and RNA
C. are particularly numerous in metabolically active cells
D. both A) and B)
E. Both B) and C)

2. Ribosomes, endoplasmic reticulum and the Golgi apparatus functionally act in sequence to synthesize and modify proteins for secretion only, never for use by the cell. This statement is:

A. FALSE: Proteins made by this system are for use inside the cell only.
B. FALSE: Integral cell membrane proteins are also synthesized in this way.
C. FALSE: Lipids, not proteins, are synthesized this way.
D. TRUE.

3. Which of the following mature cells do not contain nucleus?

A. Glial cells
B. Skeletal muscle cells
C. Red blood cells
D. Columnar epithelial cells

4. In children with the Tay-Sachs disease:

A. the number of lysosomes is decreased or lysosomes are missing
B. the number of peroxisomes is decreased or peroxisomes are missing
C. a specific lysosomal enzyme digesting ganglioside is missing
D. a specific mitochondrial enzyme is missing

5. Which cell organelle is the site of fatty acid, phospholipid and steroid synthesis?

A. Golgi complex
B. Lysosome
C. Mitochondria
D. Rough endoplasmic reticulum
E. Smooth endoplasmic reticulum

6. Which of the following is/are TRUE? (The question is not included in the marking of the exam)

A. Nucleosomes provide a physical means of packing DNA
B. Facilitated diffusion always requires a membrane protein
C. Vaults are believed to be carriers of molecules such as mRNA (from nucleus to cytoplasm)
D. Both A) and C) are true. **(Should be all of the above)**

7. Peroxisomes:

A. absorb nutrients from digested foods and store them for future use
B. produce mucus that protects parts of the digestive organs from the effects of powerful enzymes needed for food digestion
C. secrete buffers in order to keep the pH of the digestive tract close to neutral
D. are necessary for survival because of their role in detoxification and neutralization of free radicals

8. Which of the following is/are TRUE?

A. Microtubules are the smallest of the cyoskeletal structures found in cells
B. Cytoskeleton provides cells with support and allows some degree of motility
C. The mitotic spindle is formed by the migration of chromatin
D. Intermediate filaments are made of actin
E. Both A) and B) are true

9. Cholesterol:

A. is one of the determinants of the fluidity index of plasma membranes
B. is involved in protein transport
C. is the main constituent of plasma membranes
D. both A) and B)
E. all of the above

10. How are phospholipid molecules arranged within the lipid bilayer of the plasma membrane? (ECF=extracellular fluid; ICF=intracellular fluid)

A. Phospholipid molecules are arranged randomly.
B. The polar lipid tails are oriented toward the ECF and the ICF because they are hydrophobic.
C. The polar phosphate heads are oriented toward the ECF and ICF because they are hydrophilic.
D. The nonpolar lipid tails are oriented toward the ECF and the ICF because they are hydrophobic.
E. The nonpolar phosphate heads are oriented toward the ECF and ICF because they are hydrophobic.

11. An exocrine gland in which a cell filled with secretory product ruptures and dies in the process of releasing that product is called a(n):

A. acinar gland
B. apocrine gland
C. merocrine gland
D. simple gland
E. holocrine gland

12. The urinary bladder is lined with:

A. simple squamous epithelium
B. stratified cuboidal epithelium
C. transitional epithelium
D. simple columnar epithelium
E. loose connective tissue

13. Select the correct statement regarding epithelia:

A. simple epithelia form impermeable barriers.
B. stratified epithelia are tall, narrow cells.
C. stratified epithelia are present where protection from abrasion is important.
D. pseudostratified epithelium consist of several layers of cells

14. A multilayered epithelium with cuboidal basal cells and flat cells at its surface would be classified as:

A. simple cuboidal
B. simple squamous
C. transitional
D. stratified squamous
E. None of the above; there is no epithelium that matches this description.

15. The fibre type that gives connective tissue great tensile strength is:

A. elastic fiber
B. collagen fiber
C. reticular fiber
D. muscle fiber

16. Which statement best describes connective tissue?

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

17. The suffix "blast" in a connective tissue indicates a(n):

A. cell that has ruptured
B. mature cell with reduced capacity for cell division
C. cell that is part of an exocrine gland
D. immature cell that can still divide
E. cell that cannot divide

18. A thin, flat, one layer epithelium "built" to allow easy diffusion is:

A. simple squamous
B. simple cuboidal
C. pseudostratified columnar
D. stratified squamous
E. simple columnar

19. Which of the characteristics of the adipose tissue is TRUE?

A. The visceral adipose tissue is metabolically active
B. The main role of brown fat is heat production
C. The TNF-α produced by adipose tissue has been associated with chronic inflammation
D. Both B) and C) are true
E. All of the above are true

20. The three main components of connective tissue are:

A. ground substance, fibres and cells
B. alveoli, fibrous capsule and secretory cells
C. collagen, elastin and reticular fibers
D. fibroblasts, chondroblasts and osteoblasts

21. The movement of oxygen from an area of high concentration to an area of low concentration is an example of:

A. osmosis
B. active transport
C. diffusion
D. facilitated diffusion
E. filtration

22. Cells try to move sodium ions from the cytoplasm to the outside of the cell where the sodium concentration is 14 times higher than in the cytoplasm. This means sodium ions are moved out of the cells by:

A. simple diffusion
B. facilitated diffusion
C. osmosis
D. active transport
E. exocytosis

23. The type of cell junction that prevents the contents of the stomach or urinary bladder from leaking into surrounding tissues is the:

A. adherens junction
B. gap junction
C. desmosome
D. integral junction
E. tight junction

24. Gap junctions are:

A. junctions which fuse membrane proteins in order to prevent the passage of molecules
B. junctions linking cells to resist mechanical stress
C. channels between cells that allow the passage of molecules from the cytoplasm of one cell to the cytoplasm of the next cell
D. junctions that "punch holes" in basement membranes

25. Which type of junction is an anchoring junction that is linked to the cytoskeleton and designed to provide strength of cell-to-cell attatchment?

A. tight junction
B. desmosome
C. glycocalyx
D. integral junction
E. gap junction

26. Which of these would you expect to find on cells whose main function is absorption?

A. microvilli
B. cilia
C. desmosomes
D. gap junctions
E. secretory vesicles

27. A red blood cell placed in pure water would:

A. shrink
B. swell initially, then shrink as equilibrium is reached
C. neither shrink nor swell
D. swell and burst
E. none of the above

28. Water:

A. moves against its concentration gradient
B. moves across the semi-permeable membrane toward a greater concentration of the solute
C. moves down its concentration gradient
D. Both B) and C)
E. both A) and B) are correct

29. Which of the following statements is TRUE regarding diffusion?

A. The rate of diffusion is independent of temperature.
B. The rate of diffusion depends on temperature and the surface area.
C. The molecular weight of a substance does not affect the rate of diffusion.
D. The lower the temperature, the faster the diffusion rate.

30. Clathrin coating vesicles:

A. Clathrin coats the plasma membrane on the cytoplasmic face of the coated pit
B. Clathrin coats the plasma membrane on the extracellular face of the coated pit
C. Clathrin is involved in cargo selection and formation of coated pits
D. Both B) and C)
E. Both A) and C)

31. Which of the following is the major positive ion OUTSIDE cells?

A. nitrogen
B. hydrogen
C. potassium
D. sodium
E. chloride

32. An excitatory neurotransmitter that changes the membrane potential from -70 to -65 mV causes:

A. impulse conduction
B. partial depolarization
C. inhibition
D. hyperpolarization
E. production of an action potential

33. Saltatory conduction is made possible by:

A. the myelin sheath
B. large nerve fibers
C. diphasic impulses
D. erratic transmission of nerve impulses

34. All of the following are true of graded potentials EXCEPT that they:

A. are short-lived
B. can form on the dendrites of sensory receptor neurons
C. increase in amplitude as they move away from the point of stimulation
D. can be called postsynaptic potentials

35. The point at which an impulse from one nerve cell is communicated to another nerve cell is the:

A. cell body
B. synapse
C. receptor
D. effector

36. Calcium ions play an essential role in chemical synapses because they are necessary for:

A. the release of neurotransmitters by exocytosis.
B. the diffusion of neurotransmitters across the synaptic cleft.
C. the opening of the chemically-gated ions channels of the postsynaptic membrane.
D. the generation of the action potential on the postsynaptic dendritic or cell body membrane.

37. Neuroglia that have an ability to modulate the amount of neurotransmitter available at the postsynaptic membrane are called:

A. ependymal cells
B. Schwann cells
C. oligodendrocytes
D. astrocytes
E. microglia

38. Which of the following statements is TRUE?

A. Saltatory conduction occurs because of the presence of salt (NaCl) around the neuron.
B. Strong stimuli cause the amplitude of action potentials to increase.
C. Myelination of neuronal axons in the central nervous system is performed by the oligodendrocytes.
D. The two major classes of graded potentials are transmitter potentials and receptor potentials.

39. Which of the following will occur when an excitatory postsynaptic potential (EPSP) is being generated on the dendritic membrane?

A. specific sodium gates will open
B. specific potassium gates will open
C. sodium gates will open first, then close as potassium gates open
D. a single type of channel will open, permitting simultaneous flow of sodium and potassium

40. Action potentials:

A. are usually unidirectional
B. are all-or-none phenomena
C. are induced by Na+/K+ ATPase
D. A) and C)
E. A) and B)

41. During the depolarizing phase of an action potential:

A. K+ gates are open
B. Both activation and inactivation Na+ gates are open
C. Na+/K+ ATPase is maximally active
D. A) and B)
E. none of the above

42. Which of the following statements is TRUE?

A. The afferent nerve fibers carry impulses from the CNS to the effectors
B. Neurons are characterized by a short lifespan
C. Myelination of neuronal axons in the peripheral nervous system is performed by oligodendrocytes.
D. Regions of the brain and spinal cord containing dense collection of myelinated fibers is called white matter

43. EPSPs:

A. are nerve impulses that jump from node to node
B. allow activity of neurons to be synchronized
C. induce membrane hyperpolarization
D. are graded, local depolarizations
E. are the slowest step of neurotransmission

44. When acetylcholine binds to chemically-gated postsynaptic receptors it can:

A. lead to fast opening of the muscarinic receptors on the postsynaptic cell membrane
B. lead to opening of the G-protein-associated channels on the postsynaptic cell membrane
C. lead to opening of the slow nicotinic receptors on the postsynaptic cell membrane
D. lead to opening of the voltage gated sodium/potassium channels

45. The region of the neuron where the action potential is first generated is called the:

A. soma
B. dendrite
C. axon hillock
D. node of Ranvier

46. The plasma membrane of a resting neuron is more permeable to potassium ions than to sodium ions because the membrane has:

A. more voltage-gated sodium ion channels
B. more ligand-gated potassium ion channels
C. more potassium leakage channels
D. fewer voltage-gated sodium ion channels
E. more carrier molecules for potassium ions

47. When an action potential reaches the axon terminal of a presynaptic neuron, the next event is:

A. immediate release of neurotransmitter
B. uptake of neurotransmitter from the synaptic cleft
C. diffusion of calcium ions out of the cell
D. diffusion of calcium ions into the cell
E. active transport of calcium ions out of the cell

48. Dendrites of postsynaptic neurons:

A. have chemically-gated channels
B. conduct impulses away from the cell body
C. are the site of synthesis of neurotransmitters
D. have voltage-gated channels
E. are also called axon terminals

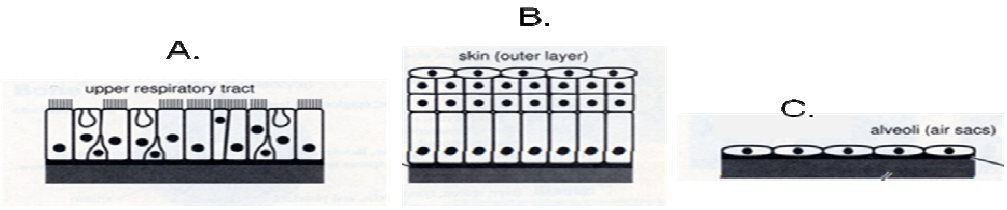
49. Which of the following statements is TRUE? (The question is not included in the marking of the exam)

A. A myelin sheath increases conduction velocity because it contains many ions channels.
B. The conduction velocity of an axon increases with increasing axon diameter.
C. Neurons are the only polarized cells in the body.
D. A myelinated fiber conducts impulses faster than an unmyelinated fiber.
E. The conduction velocity of axons is always the same

50. Which of the following statements is TRUE?

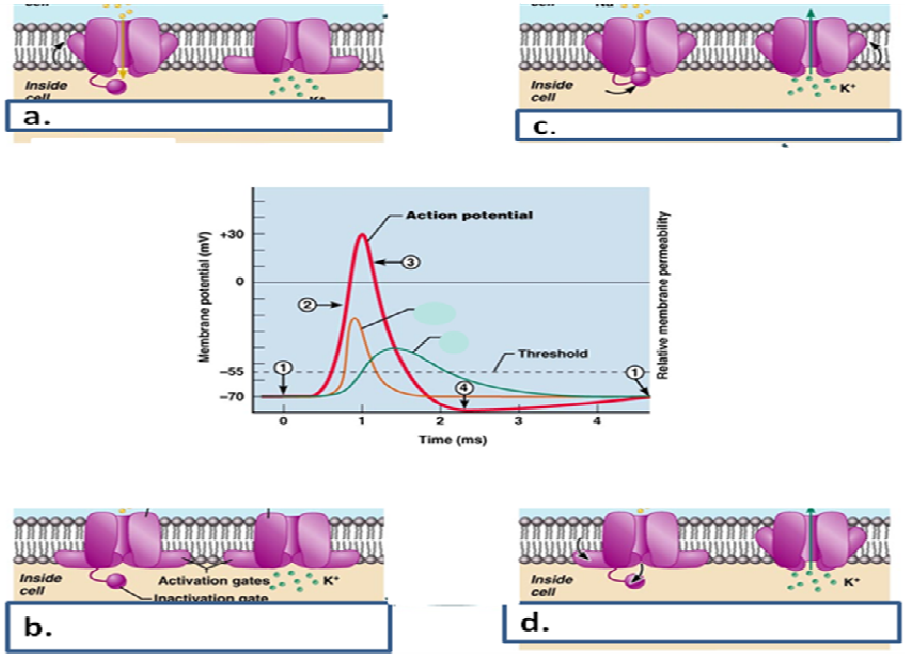
A. Almost all of the gated calcium channels are concentrated at the nodes of Ranvier of myelinated axons.
B. Chemically gated channels open when the membrane potential changes.
C. The intensity of a stimulus is indicated by the frequency of nerve impulses (action potentials).
D. The relative refractory period is the period during which the outward current carried by K+ is exactly equal to the inward current carried by Na+.
E. None of the above statements is true.

51. Which of the following types of the epithelial tissue contain mucus producing cells? A



52. Which of the following represents depolarization?

A. a1
B. a2
C. c2
D. c3
E. d4



BONUS QUESTION

List 4 differences between the graded potentials and action potentials (0.5 mark each correct difference; 2 marks total)