1. You have a 2.0 M solution of NaCl. You want to make a solution of glucose that is the same osmolarity as this NaCl solution. What concentration should the glucose solution be?

A. 0.5 M
B. 1.0 M
C. 2.0 M
D. 3.0 M
E. 4.0 M

2. Cell junctions that promote the coordinated activity of cells by physically binding them together into a cell community include all of the following EXCEPT:

A. gap junctions
B. desmosomes
C. peroxisomes
D. tight junctions

3. Immediately after an action potential has peaked, which cellular gates open?

A. sodium
B. chloride
C. calcium
D. potassium
E. none of the above

4. Which of the following statements about an action potential is TRUE?

A. Threshold is usually 0 mV.
B. The hyperpolarization undershoot occurs because K+ gates are slow to close.
C. Inactivation Na+ gates respond more rapidly than activation Na+ gates.
D. Action potentials decrease in amplitude with distance traveled.
E. A second depolarization can occur during the absolute refractory period if the stimulus is greater than threshold.

5. Collagen in connective tissue proper is produced by:

A. macrophages
B. fibroblasts
C. hemocytoblasts
D. osteoblasts
E. chondroblasts

6. Functions of this tissue include insulation, energy storage and protection. This tissue is likely:

A. simple epithelial tissue
B. fibrous connective tissue
C. smooth muscle tissue
D. adipose connective tissue
E. none of the above

7. What part of the sarcolemma contains acetylcholine receptors?

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

8. Centrioles:

A. organize the mitotic spindle during cell replication
B. provide a whip-like beating motion to move substances along cell surfaces
C. serve as the site for ribosomal RNA synthesis
D. produce ATP

9. In a concentric isotonic contraction, the muscle:

A. becomes shorter and moves "the load"
B. does not change in length and increases tension
C. becomes longer and moves the load
D. becomes shorter but does not change tension

10. Epithelial tissue (Avascular)

A. is highly vascularized
B. sits on a basement membrane
C. usually has a higher proportion of matrix than cells
D. all of the above

11. The function of the gap junctions in cardiac muscle is to:

A. provide channels for the transport of glucose and amino acids
B. prevent adjacent cells from separating during contraction
C. allow ions to pass from cell to cell, transmitting current across the entire heart

12. The neurotransmitter released at neuromuscular junctions between motor axons and skeletal muscle is:

A. epinephrine
B. acetylcholine
C. norepinephrine
D. dopamine
E. none of the above

13. Which cells are commonly found wedged between simple columnar epithelial cells?

A. goblet cells
B. mast cells
C. macrophages
D. cilia

14. The shape of the external ear is maintained by:

A. adipose tissue
B. elastic cartilage
C. hyaline cartilage
D. dense irregular connective tissue
E. fibrocartilage

15. Intestinal cells absorb glucose, galactose and fructose by carrier-mediated transport. Poisoning the cell's mitochondria (no ATP production) inhibits the absorption of glucose and galactose but not that of fructose. By what processes are these sugars absorbed?

A. All are absorbed by facilitated diffusion.
B. All are absorbed by secondary active transport.
C. Glucose and galactose are absorbed by secondary active transport, but fructose is absorbed by facilitated diffusion.
D. Fructose is absorbed by primary active transport but glucose and galactose are absorbed by facilitated diffusion.
E. None of the above.

16. In order to preserve cellular homeostasis, an important active transport pump within the cell membrane ejects ... ions from the cell and imports ..... ions.

A. 3 potassium; 2 calcium
B. 3 sodium; 2 calcium
C. 2 potassium; 3 sodium
D. 3 sodium; 2 potassium
E. 2 calcium; 3 sodium

17. Which type of epithelium lines the mouth?

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

18. 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

19. The thin connective tissue investing each muscle cell is called:

A. perimysium
B. sarcolemma
C. fascicle
D. epimysium
E. endomysium

20. Myoglobin is:

A. a contractile protein
B. a calcium-binding protein
C. an oxygen-binding protein
D. found in smooth muscle only
E. none of the above

21. What structures are fingerlike projections that greatly increase the absorbing surface of cells?

A. stereocilia
B. microvilli
C. cilia
D. flagella

22. ..... epithelium appears to have two or three layers of cells, but all the cells are in contact with the basement membrane.

A. Stratified cuboidal
B. Stratified columnar
C. Transitional
D. Pseudostratified columnar

23. During endocytosis:

A. a section of the plasma membrane breaks off and forms a vesicle inside the cell
B. transport can consist of either pinocytosis or phagocytosis
C. water can enter the cell
D. there may be fusion with a lysosome
E. all of the above

24. Red blood cell membranes are not normally permeable to NaCl and maintain an intracellular concentration of NaCl of 0.9%. If these cells are placed in a 2% NaCl solution, what would happen?

A. Nothing, because the membrane is not permeable to NaCl.
B. Water will enter the cell because the intracellular fluid has a higher osmotic pressure.
C. The cell will undergo hemolysis due to membrane damage from the 2% NaCl solution.
D. The cell will shrink because the extracellular solution has a higher osmotic pressure.
E. The cell will start to generate NaCl to make up the difference in concentrations.

25. 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

26. The tonicity of extracellular fluid:

A. refers to the total concentration of solutes in that fluid
B. can also be described as the osmolarity of that fluid
C. is always higher than the tonicity of intracellular fluid
D. indicates the concentration of nonpenetrating solutes in that fluid
E. has no influence on the water content of intracellular fluid

27. 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
E. axon hillock

28. In which neuron would an action potential be conducted most rapidly?

A. large diameter, unmyelinated neuron
B. large diameter, myelinated neuron
C. small diameter, unmyelinated neuron
D. small diameter, myelinated neuron

29. 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

30. Filtration:

A. transports against a concentration gradient.
B. is driven by hydrostatic pressure.
C. is driven by a concentration gradient.

31. Which of the following is NOT a shape of epithelial tissue?

A. squamous
B. cuboidal
C. spherical
D. columnar

32. The type of muscle tissue that is both striated and involuntary is:

A. skeletal muscle tissue ← S & V
B. smooth muscle tissue ← nons & in
C. cardiac muscle tissue ← in & s
D. both cardiac and smooth muscle tissue

33. The major function of the sarcoplasmic reticulum in muscle cells is to:

A. store sodium ions
B. synthesize lipids
C. store potassium ions and large anions
D. store calcium ions

34. Collections of nerve cell bodies inside the central nervous system are called:

A. nuclei
B. nerves
C. ganglia
D. tracts
E. none of the above

35. Which of the following is/are most correct? overcome a load

A. Muscle length and tension remain constant during isotonic contractions. X
B. Myofilaments are sliding during isotonic contractions. ✓→
C. Isotonic contractions can be concentric or eccentric.
D. B) and C)

↓ no shortening ↓ Shortens

36. Salivary glands are examples of: endo

A. holocrine glands →
B. merocrine glands →
C. endocrine glands X
D. apocrine glands

37. In the maintenance of the cell resting membrane potential:

A. extracellular sodium levels are high
B. cells are more permeable (leaky) to Na+ than to K+ X
C. the steady state (equilibrium) involves only passive processes
D. the inside of the cell is positive relative to the outside. X
E. A) and B)

38. 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 membrane.

39. Tendons and ligaments are composed of:

A. areolar connective tissue
B. dense irregular connective tissue
C. elastic connective tissue
D. reticular connective tissue
E. dense regular connective tissue

40. Which of the following is the major positive ion INSIDE cells?

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

41. The Golgi complex is most extensive is cells that:

A. do not reproduce
B. have many mitochondria
C. move fluids across their surfaces
D. secrete proteins into the extracellular fluid
E. frequently change their shape

42. During the repolarization phase of an action potential, which of the following is the primary activity?

A. Potassium ions are flowing into the cell.
B. Potassium ions are flowing out of the cell.
C. Sodium ions are flowing into the cell.
D. Sodium ions are flowing out of the cell.
E. The membrane is impermeable to all ions.

43. Both the electrical and chemical gradients for ..... are enhanced by the resting membrane potential.

A. Na+
B. K+
C. Cl-
D. None of the above

44. Saltatory conduction is made possible by:

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

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

A. Tropomyosin is the name of a contracting unit.
B. Tropomyosin serves as a contraction inhibitor by blocking the myosin binding sites on the actin molecules.
C. Tropomyosin serves as a contraction inhibitor by blocking the actin binding sites on the myosin molecules.
D. Tropomyosin is the receptor for the motor neuron neurotransmitter.

46. How are phospholipids 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.

47. EPSPs

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

48. A 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.

49. 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.

50. After nervous stimulation stops, what prevents ACh in the synaptic cleft from continuing to stimulate contraction?

A. calcium ions returning to the terminal cisternae.
B. the tropomyosin blocking the myosin once full contraction is achieved.
C. acetylcholinesterase destroying the ACh.
D. the action potential stops going down the overloaded T tubules.

51. The term that refers to a measure of the potential energy of separated electrical charges is

A. conductance.
B. resistance.
C. current.
D. voltage.

52. Rigor mortis occurs because

A. the plasma membranes of dead cells become stiff.
B. sodium ions leak out of the muscle.
C. ATP is required to release the attached actin and myosin molecules.
D. proteins are beginning to break down, thus preventing a flow of calcium ions.