1. Which of the following is a characteristic of a graded potential?

A. produced at axon hillock
B. all-or-none
C. current decreases with distance travelled
D. always induces membrane hyperpolarization

2. The Na+/K+ ATPase:

A. pumps 3 Na+ ions outside the cells and 2 K+ ions inside.
B. pumps 3 Na+ ions outside the cell and 3 K+ ions inside.
C. pumps 3 Na+ ions inside the cell and 2 K+ ions outside.
D. pumps 2 Na+ ions inside the cell and 3 K+ ions outside.

3. Multicellular exocrine glands can be classified:

A. structurally into alveolar and acinar types
B. structurally into ductless and ducted types
C. functionally into merocrine, holocrine, and apocrine divisions
D. All of the above are correct

4. Crenation (cell shrinking) occurs when a blood cell is placed in a(n) ..... solution.

A. isotonic
B. hypertonic
C. hypotonic
D. merotonic

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+

6. In an axon, newly synthesized proteins move due to

A. retrograde transport
B. anterograde transport
C. carrier mediated Transport
D. action potentials

7. Select the correct statement concerning epithelia.

A. Stratified epithelia are tall, narrow cells.
B. Stratified epithelia are present where protection from abrasion is important.
C. Stratified epithelia are seldom found in the human body.
D. Pseudostratified epithelia consist of at least two layers of cells stacked on top of one another.

8. Regarding the membrane potential.

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^+ and Na^+ions.
D. All of the above are true

9. There is one-way conduction at a synapse because:

A. only postsynaptic dendrites contain synaptic vesicles.
B. acetylcholine prevents nerve impulses from traveling in both directions.
C. only the postsynaptic dendrites possess neurotransmitter receptors.
D. only presynaptic dendrites release neurotransmitters.

10. Action potential travel down the axon is associated with:

A. graded potentials
B. chemically gated ion channels
C. hyperpolarization
D. voltage-gated sodium channels

11. Phrases that describe cartilage include:

A. avascular
B. holds large volumes of water
C. is not innervated
D. contains collagen fibers
E. All of the above

12. A cluster of neuron cell bodies in the peripheral nervous system is known as a/an:

A. nissl body
B. axon hillock
C. ganglion
D. node of Ranvier

13. 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

14. The area on an axon between 2 Schwann cell sheaths is the:

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

15. Collagen in connective tissue proper is produced by:

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

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

A. Extreme longevity
B. Amitotic
C. High metabolic rate
D. Negative potential across the plasma membrane

17. What types of gated channels are found in the conductive region of a neuron?

A. Ligand gated Na+ channels
B. Voltage gated Na+ channels
C. Voltage gated K+ channels
D. B and C are correct

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

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

19. Most exocrine glands in the human body are classified as:

A. acinar
B. apocrine
C. holocrine
D. merocrine
E. endocrine

20. Creatine phosphate functions in the muscle cell by

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

21. 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

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

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

23. In a skeletal muscle fiber, which of the following best describes the composition of the structure known as a triad?

A. Actin, troponin and tropomyosin
B. Sarcolemma, sarcoplasm and sarcoplasmic reticulum
C. Terminal cisterna, transverse tubule and terminal cisterna
D. A band, I band and H band

24. Muscle tone is:

A. also called treppe
B. the feeling of well-being following exercise
C. a state of sustained partial muscle contraction
D. the condition of athletes after intensive training

25. Muscle tissue has all the properties except

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

26. The function of myoglobin is to:

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

27. Which of the following is considered a unicellular exocrine gland?

A. mast cell
B. plasma cell
C. fibroblast
D. adipocytes
E. goblet cell

28. The "cis" face of the Golgi apparatus:

A. is where products are dispatched in vesicles
B. is its concave face
C. receives transport vesicles from the rough endoplasmic reticulum
D. is in the centre of the Golgi stack
E. is continuous with the nuclear membrane

29. Centrioles:

A. are the site of growth of microtubules during mitosis
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

30. One of the key contractile mechanism protein found in skeletal muscle but not in smooth muscle is

A. Tropomyosin
B. Myosin
C. Actin
D. troponin

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

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

32. Which of the following is the connective tissue sheath that wraps individual muscle fibers?

A. endomysium
B. perimysium
C. epimysium
D. aponeurosis

33. During vigorous exercise, there may be insufficient oxygen available to completely break down pyruvic acid for energy. As a result, the pyruvic acid is converted to _____.

A. a strong base
B. stearic acid
C. hydrochloric acid
D. lactic acid

34. 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

35. 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

36. 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.

37. The sliding filament model of contraction involves _____.

A. actin and myosin sliding past each other and partially overlapping
B. the shortening of thick filaments so that thin filaments slide past
C. actin and myosin lengthening in order to slide past each other
D. the Z discs sliding over the myofilaments

38. Characteristics of epithelial tissue include all of the following EXCEPT:

A. an actively dividing layer of cells
B. cells attached to underlying basement membrane
C. a well-developed blood supply
D. presence of very little extracellular material

39. Cell types likely to be found in areolar connective tissue include all EXCEPT:

A. chondrocytes
B. fibroblasts
C. macrophages
D. mast cells

40. The plasma membrane presents a(n) ..... barrier to free diffusion of solutes.

A. hydrophilic
B. semiimpermeable
C. hydrophobic
D. water-soluble

41. Osmosis is a special case of diffusion in which:

A. water moves down its concentration gradient.
B. water is moving against its concentration gradient.
C. water is moving from an area of high solute concentration to an area of low solute concentration
D. A. and C.

42. The most abundant chemical substance in the body accounting for 60 to 80% of body weight is

A. protein
B. water
C. oxygen
D. hydrogen

43. 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

44. Pseudostratified columnar epithelium ciliated variety _____

A. lines most of the respiratory tract
B. aids in digestion
C. possesses no goblet cells
D. is not an epithelial classification

45. You have a 2.0 molar solution of NaCl. You want to make a solution of glucose that has the same osmolarity as this NaCl solution. What concentration (molar) should this glucose solution be?

A. 0.5
B. 1.0
C. 2.0
D. 4.0

46. Active transport:

A. is specific
B. involves carrier
C. moves substances against a concentration gradient
D. A., B. and C.

47. The process by which large particles may be taken into the protection of the body by invaders like bacteria, or for disposing of old or dead cells is called

A. Endocytosis
B. Pinocytosis
C. Phagocytosis
D. Exocytosis

48. The two layers of the basement membrane are the

A. apical and basal layers
B. parietal and visceral layers
C. lamina propria and epithelial layers
D. avascular and vascular layers
E. basal lamina and reticular lamina

49. Peripheral proteins are:

A. proteins that are attached to integral proteins (usually 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

50. 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

51. Desmosomes:

A. Fuse the cell membranes of adjacent cells to prevent the diffusion of molecules in solution
B. Are clusters anchoring molecule, linking cells together to resist mechanical stress
C. Form molecular channels between cells to allow passage of small molecules and charged ions
D. All of the above are true

52. Which of the following statements is TRUE?

A. The basic difference between dense irregular and dense regular connective tissue is the amount of elastic fibers and adipose cells present.
B. Sweat glands are apocrine glands.
C. Blood is a type of connective tissue.
D. Connective tissues that possess a large quantity of collagen fibers often provide the framework for organs such as the spleen and lymph nodes.
E. All of the above statements are true.

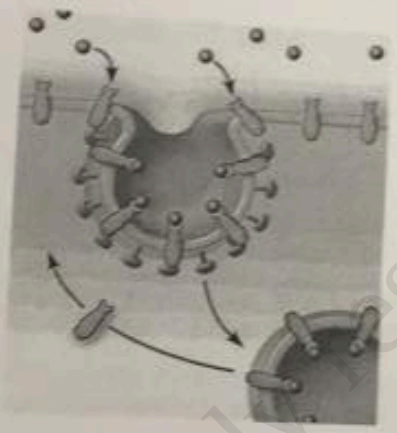
53. The cell membrane is freely permeable to

A. Fat
B. Oxygen
C. Urea
D. All of the above

7/9

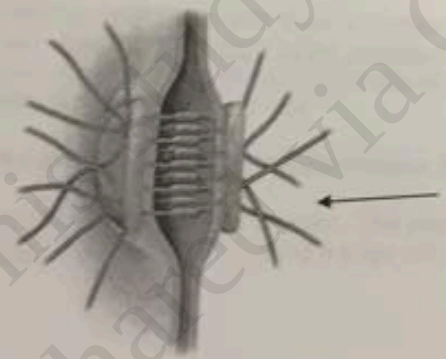
For questions 54-59, please write your answers right in this table (1 mark each).

#	DESCRIPTION	ANSWER
54	I am the Ca++ sensitive component of muscle contraction	troponin ✓
55	Ca++ is pumped back into me to end muscle contraction	Sarcoplasmic reticulum ✓
56	I am the process in nerve terminals that produces Ca++ dependent neurotransmitter release	synaptic transmission ✗ Exocytosis
57	I terminate the action of ACh at the muscle end late	acetylcholinesterase ✓
58	Two of me make one chromosome	sister chromatid ✓
59	I can be free in the cytoplasm or attached to a membrane and I am the site of protein synthesis	ribosome ✓
60	I am the cytoskeletal component that allows cilia to move mucus through the respiratory passageways.	~~Ciliated membrane~~ ? microtubules ✗



61. What common cell functions is shown in the diagram? Be specific.

receptor-mediated endocytosis ✓



62. This type of junction is found between cells that make up epithelial tissue? Be specific.

desmosome ✓