BMD 334 **Name _____**
Human Physiology
Practice Exam 2 **Student ID _____**
Sample 2

There are 50 multiple choice questions. All answers must be recorded on the computer form to receive credit. Choose the one best answer. 2 points each.

1. What type of chemical messenger is released into the bloodstream by an endocrine gland where it can affect target cells throughout the body?
A) paracrine
B) autocrine
C) hormone
D) cytokine
E) neurotransmitter

2. Which of the following chemical messengers is lipophilic?
A) glutamate
B) histamine
C) norepinephrine
D) prostaglandins
E) gamma-amino butyric acid

3. Catecholamines are derived from what amino acid?
A) glutamate
B) tryptophan
C) tyrosine
D) histidine
E) glycine

4. Which of the following classes of chemical messengers is stored in secretory vesicles?
A) catecholamines
B) peptides/proteins
C) steroids
D) eicosanoids
E) A and B

5. In order to synthesize eicosanoids, _____ catalyzes the release of _____ from a membrane phospholipid.
A) phospholipase A_2 : cholesterol
B) phospholipase C : arachidonic acid
C) phospholipase A_2 : arachidonic acid
D) phospholipase C : cholesterol
E) phospholipase C : inositol biphosphate

6. Which of the following will NOT affect the magnitude of a cell's response to a specific hydrophilic ligand?
A) ligand concentration
B) number of receptors
C) receptor upregulation
D) affinity of the receptor for the ligand
E) lipid solubility of the ligand

7. Which of the following ions can act as a second messenger?

A) sodium
B) potassium
C) calcium
D) A and B
E) A and C

8. Which of the following proteins are integral membrane proteins?

A) tyrosine kinase
B) G proteins
C) calmodulin
D) A and B
E) All of the above

9. The enzyme that catalyzes synthesis of cAMP is called _____ and is activated by _____. The enzyme that breaks down cAMP is called _____.

A) adenylate cyclase : G_s protein : phosphodiesterase
B) phospholipase C : G_s protein : adenylate cyclase
C) phospholipase C : G_i protein : phosphodiesterase
D) adenylate cyclase : G_i protein : phospholipase C
E) phosphodiesterase : G_s protein : protein kinase C

10. Which of the following enzymes is activated by a G protein?

A) phospholipase A_2
B) adenylate cyclase
C) tyrosine kinase
D) A and B
E) All of the above

11. Which of the following can produce a response in a cell through covalent modulation?

A) cAMP
B) tyrosine kianse
C) calcium
D) A and B
E) All of the above

12. Which of the following accurately describes afferent neurons?

A) They transmit information from the periphery to the central nervous system.
B) The cell body is located in the ventral horn of the spinal cord.
C) They are the most abundant class of neurons.
D) A and B
E) All of the above

13. An action potential originates at the _____ and travels along the axon until it reaches the _____.

A) axon terminal : axon hillock
B) dendrite : axon terminal
C) axon hillock : dendrite
D) dendrite : axon hillock
E) axon hillock : axon terminal

14. Which of the following best describes the electrochemical forces acting on sodium and potassium ions at the resting membrane potential?

A) Forces on both sodium and potassium ions are to move into the cell.
B) Forces on both sodium and potassium ions are to move out of the cell.
C) The force on sodium ions is to move into the cell, and the force on potassium ions is to move out of the cell.
D) The force on sodium ions is to move out of the cell, and the force on potassium ions is to move into the cell.
E) There is no force on either ion to move.

15. If, under resting conditions, the membrane is much more permeable to sodium than potassium, the resting membrane potential would _____.

A) be altered very little
B) become more negative
C) approach potassium's equilibrium potential
D) approach sodium's equilibrium potential
E) approach 0

16. The depolarization phase of an action potential is generated by a rapid _____.

A) opening of sodium channels
B) opening of potassium channels
C) opening of chloride channels
D) closing of sodium channels
E) closing of potassium channels

17. During which of the following states are the majority of voltage-gated sodium channels closed and incapable of opening?

A) at the resting membrane potential
B) during depolarization
C) during the absolute refractory period
D) during the relative refractory period
E) during the after-hyperpolarization

18. Which of the following characteristics of an action potential does NOT result directly from the refractory period?

A) the lack of summation of action potentials
B) the all-or-none principle of action potentials
C) the peak level of depolarization reached
D) the frequency of action potentials
E) the unidirectional propagation of action potentials

19. The jumping of an action potential from node-to-node is called _____.

A) nodal conduction
B) anodal conduction
C) electrotonic conduction
D) saltatory conduction
E) interionic conduction

20. Which of the following statements is FALSE?
A) Graded potentials can sum over time, but action potentials cannot.
B) Graded potentials do not have refractory periods, but action potentials do.
C) Graded potentials and action potentials are all-or-none.
D) Graded potentials and action potentials are caused by ions moving through channels.
E) Graded potentials and action potentials can change the membrane potential of adjacent areas of the membrane through electrotonic conduction.

21. In a neuron, where are voltage-gated calcium channels located?
A) dendrites
B) soma
C) axon hillock
D) axon terminal
E) more than one of the above

22. Synaptic vesicles store _____.
A) calcium
B) sodium
C) potassium
D) neurotransmitter
E) enzymes

23. At ionotropic receptors, _____.
A) neurotransmitter binding to a receptor opens channels that are a part of the same protein as the receptor
B) neurotransmitter binding to a receptor opens channels that are a separate protein from the receptor
C) neurotransmitter binding to a receptor opens or closes channels that are a part of the same protein as the receptor
D) neurotransmitter binding to a receptor opens or closes channels that are a separate protein from the receptor
E) none of the above

24. The most common mechanism for producing a fast EPSP involves which of the following?
A) opening of sodium-selective channels
B) opening of potassium-selective channels
C) closing of sodium-selective channels
D) closing of potassium-selective channels
E) opening of channels that permit both sodium and potassium to flow through

25. In the presence of active chloride ion transport within a neuron, the opening of chloride channels will result in the _____.
A) net movement of chloride out of the cell
B) net movement of chloride into the cell
C) movement of chloride equally in both directions
D) absence of any chloride movement
E) depolarization of the cell

26. For fast receptors, their _____ response _____ the likelihood that two pulses from the same neuron will cause summation on the postsynaptic neuron.
A) rapid : decreases
B) rapid : increases
C) rapid : does not affect
D) slow : decreases
E) slow : increases

27. Which of the following best describes presynaptic facilitation?
A) The modulating neuron causes an EPSP on the postsynaptic cell.
B) The modulating neuron enhances neurotransmitter release from the postsynaptic cell.
C) The modulating neuron triggers an action potential in the postsynaptic cell.
D) The modulating neuron stabilizes the membrane potential of the postsynaptic cell.
E) The modulating neuron decreases the effective communication between the cell it is modulating and that cell's postsynaptic cell.

28. The action of adrenergic receptors identifies them as _____ receptors.
A) metabotropic
B) chemotropic
C) ionotropic
D) voltage-gated
E) mechanically-gated

29. Fast EPSPs are produced at which of the following receptor types?
A) nicotinic cholinergic
B) alpha adrenergic
C) AMPA receptors
D) A and B
E) A and C

30. _____ is an amino acid neurotransmitter at excitatory synapses, whereas _____ is an amino acid neurotransmitter at inhibitory synapses.
A) GABA : glutamate
B) acetylcholine : glycine
C) Glycine : epinephrine
D) Aspartate : GABA
E) Acetylcholine : glutamate

31. Which of the following is a graded potential?
A) fast EPSP
B) slow EPSP
C) membrane stabilization
D) A and B
E) All of the above

32. What two enzymes catalyze the breakdown of catecholamines?
A) catechol-O-methyltransferase and acetylcholinesterase
B) acetylcholinesterase and dopa decarboxylase
C) monoamine oxidase and phenylethanolamine N methyltransferase
D) dopa decarboxylase and phenylethanolamine N methyltransferase
E) monoamine oxidase and catechol-O-methyltransferase

33. What type of glial cell is necessary for normal development of the blood brain barrier?
A) astrocytes
B) oligodendrocytes
C) ependymal cells
D) microglia
E) Schwann cells

34. Cerebrospinal fluid is produced within the _____ and is reabsorbed into the venous circulation by special structures called the _____.
A) choroid plexus : subarachnoid space
B) central canal : arachnoid villi
C) central canal : subarachnoid space
D) choroid plexus : arachnoid villi
E) central canal : ependymal space

35. Where is the cauda equina?
A) surrounding the central canal
B) surrounding the ventricles
C) within the ventricles
D) within the cranium
E) within the vertebral column

36. What type of fibers are located in the dorsal roots?
A) afferents
B) efferents
C) interneurons
D) A and B
E) All of the above

37. The central sulcus separates the _____.
A) cerebellum from the forebrain
B) brainstem from the spinal cord
C) thalamus from the hypothalamus
D) frontal lobe from the parietal lobe
E) temporal lobe from the parietal lobe

38. Which of the following is NOT a function of the hypothalamus?
A) communication between the nervous and endocrine system
B) regulates hunger and thirst
C) affects emotions and behaviors in response to emotions
D) regulates body temperature
E) contains the cardiovascular control centers

39. What type of reflex occurred when Pavlov's dogs salivated in response to the ringing of a bell?
A) conditioned
B) cranial
C) visceral
D) polysynaptic
E) All of the above

40. Which of these brain structures, outside of the cortex, is NOT involved in assisting with motor programming and providing feedback on the execution of a motor program?
A) cerebellum
B) thalamus
C) basal nuclei
D) hypothalamus
E) brainstem nuclei

41. Parkinson's disease appears to target _____ cells within the _____.
A) cholinergic : substantia nigra
B) adrenergic : substantia nigra
C) dopoaminergic : substantia nigra
D) adrenergic : red nuclei
E) cholinergic : red nuclei

42. A person with aphasia would have which of the following symptoms?
A) deafness
B) difficulty in communicating
C) intention tremors
D) inability to sleep
E) night sweats

43. Which of the following is NOT characteristic of rapid eye movement (REM) sleep?
A) postural muscles lose tone
B) thoughts are illogical and bizarre
C) increased parasympathetic activity
D) increased brain activity
E) decreased limbic system activity

44. The _____ is the principle region of the brain that is involved in the induction of slow-wave sleep.
A) limbic system
B) pons
C) forebrain
D) reticular formation
E) cerebellum

45. When awake but resting, the brain is generating _____ waves that are detectable with an electroencephalogram.
A) alpha
B) beta
C) gamma
D) delta
E) epsilon

46. Which of the following is an example of a procedural memory?
A) learning the periodic table of the elements
B) learning to walk
C) learning somebody's name
D) A and C
E) All of the above

47. The ability of the nervous system to alter its anatomy and function in response to changes in its activity pattern is called _____.
A) remembering
B) declaration
C) plasticity
D) consolidation
E) memorizing

48. During long-term potentiation at glutamate synapses, _____.

A) the presynaptic cell releases more glutamate
B) the postsynaptic cell becomes more sensitive to glutamate
C) sodium channels and calcium channels on the postsynaptic cell open
D) A and C
E) All of the above

49. In response to stepping on a nail, the crossed-extensor reflex causes _____.

A) flexion of the leg on the side of receptor activation
B) extension of the leg on the side of receptor activation
C) extension of the leg opposite the side of receptor activation
D) flexion of the leg opposite the side of receptor activation
E) None of the above

50. A stroke occurring in the basal nuclei could produce which of the following symptoms?

A) loss of language comprehension
B) muscle rigidity
C) blindness or blurred vision
D) deafness
E) altered sleep-wake patterns