First Examination
Physiological Psychology—PSY 3803

Instructions—*Select the single best answer for each question and enter it on your answer sheet. Conceal the marks on your answer sheet from the view of others. You may write on this test booklet, but keep any marks concealed. Cheating or assisting others to cheat will not be tolerated. You have 1.5 hours to complete the test and you may leave when you have finished. Take this test booklet with you.*

PART 1—PROJECTED ITEMS

1. Select the word, name or phrase that best describes the structure(s) indicated.
   a) peripheral nervous system
   b) spinal cord
   c) brain
   d) central nervous system
   e) autonomic nervous system

2. Selected the word, name or phrase that best describes the structure(s) indicated
   (Choose from item 1)

3. What is this general type of structure?
   a) fissure
   b) gyrus
   c) lobe
   d) sulcus
   e) ventricle

4. What is this general type of structure?
   (Choose from item 3)

5 What is the specific name of this structure?
   a) Lateral fissure
   b) parietal sulcus
   c) temporal gyrus
   d) internal capsule

6. What is this part of the brain?
   a) parietal lobe
   b) occipital lobe
   c) cerebellum
   d) frontal lobe
   e) temporal lobe

7. What is this part of the brain?
   (Choose from item 6)

8. What is this part of the brain?
   (Choose from item 6)

9. What is this structure?
   a) basal ganglia
   b) lateral ventricle
   c) corpus callosum
   d) insular cortex

10. What is this structure?
    a) hypothalamus
    b) hippocampus
    c) thalamus
    d) diencephalo

11. What are these structures
    a) dorsal roots
    b) meninges
    c) dorsal column
    d) dorsal root ganglia
    e) cranial nerves

12. What are these structures?
    (Choose from item 11)

13. What type of neuron is this?
    a) bipolar
    b) interneuron
    c) multipolar
    d) unipolar

14. What type of neuron is this?
    (Choose from item 13)

15. Name the structure indicated.
    a) axon
    b) soma
    c) dendrite
    d) myelin segment
    e) node of Ranviér

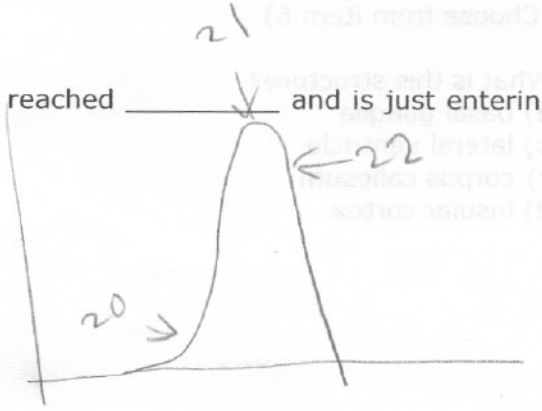
16. Name the structure indicated.
    (Choose from item 15)

17. Name the structure indicated.
    (Choose from item 15)

18. What type of cells are these?
    a) neurons
    b) astroglia
    c) oligodendroglia
    d) radial glia

19. Name the structures.
    a) blood vessels
    b) myelin segments
    c) nodes of Ranviér
    d) Schwann cells

20. At this point, the axon membrane appears to have reached _____ and is just entering the _____.
    a) IPSP, repolarization phase.
    b) threshold, depolarization phase.
    c) its refractory period, K^+ efflux phase.
    d) its refractory period, hyperpolarization phase.



21. At this point, the _____ in the axon membrane are beginning to _____
    a) K^+ channels, close
    b) Na^+ channels, open
    c) Na^+ channels, close
    d) Ca^{2+} channels, open

22. At this point, _____ is beginning to _____ the axon.
    a) K^+, enter
    b) Na^+, enter
    c) K^+, exit
    d) Na^+, exit

23. Depicted here is
    a) a voltage-gated ion channel
    b) a metabotropic ion channel
    c) an ionotropic ion channel
    d) all of the above are correct

24. Depicted in this illustration is
    a) the sodium-potassium pump
    b) one common type of ion channel found on axons
    c) a metabotropic system
    d) a presynaptic ion channel and its autoreceptor

25. To what are the lines pointing (i.e., fluorescent green spots seen along the de
    a) cell bodies
    b) mitochondria
    c) terminal buttons filled with transmitter
    d) microglia

26. Name the structure.
    a) internal capsule
    b) basal ganglia
    c) cingulate gyrus
    d) corpus callosum

27. What does this illustration depict?
    a) presynaptic terminals
    b) a segment of bilipid membrane
    c) nuclear DNA
    d) transmembrane protein channels

28. This part of the cross-section consists of
    a) myelin
    b) bilipid neural membrane
    c) axoplasm
    d) microglia

29. Name the type of synapse illustrated.
    a) gap junction
    b) ionotropic synapse
    c) metabotropic system
    d) tight synaptic junction

TEST I

30. To what primitive part of the fetal brain is the arrow pointing?
    a) metencephalon
    b) brainstem
    c) midbrain
    d) forebrain

C

PART 1I—REGULAR ITEMS

31 The process by which an individual changes over the life span is called
    a) phylogeny
    b) ontogeny
    c) reductionism
    d) phrenology

32 The ability of the brain to be changed by environmental inputs during development and in adulthood is called
    a) plasticity
    b) ontogeny
    c) dominance
    d) dementia

33 The brain and spinal cord are wrapped in protective membranes known collectively as the
    a) dura mater
    b) pia mater
    c) myelin
    d) meninges
    e) arachnoid mater

34 Which plane divides the body into left and right portions?
    a) Sagittal
    b) Frontal
    c) Coronal
    d) Horizontal

35 Axons are collected together in the CNS to form tracts. In the periphery collections of axons have the more familiar name of _____.
    a) ganglia
    b) nerves
    c) tendons
    d) fibers

36 Galen's views about the bodily origins of behavior were based on his observations of
    a) healthy, normal soldiers.
    b) the effects of manual probing of exposed brain tissue in dying gladiators.
    c) spinal reflexes in recently killed gladiators.
    d) the effects of head injuries in surviving gladiators.

37 Neurons that deliver information from the periphery to the CNS are classified as
    a) sensory
    b) efferent
    c) efferent
    d) motor
    e) both a & c

38 Functionally, cranial nerves carry which kind of information?
a) Motor and sensory
b) Motor
c) Sensory
d) None of the above

39 Aristotle thought that the brain's major function was to
a) remove wastes from the body.
b) control behavior.
c) cool the blood.
d) contain the soul.

40 The basal ganglia are most specifically implicated in
a) emotion.
b) learning and memory.
c) motor control.
d) Both b & c.

41 How many pairs of spinal nerves do humans have?
a) It varies, depending on age and height.
b) 5
c) 12
d) 31

42 A "nucleus" is
a) the spherical structure in a cell, containing chromosomes and DNA.
b) a collection of nerve cell bodies within the central nervous system.
c) Both a and b
d) None of the above

43 The cerebrospinal fluid surrounding the brain provides:
a) enhanced exchange of nutrients and waste products.
b) buoyancy.
c) a cushion against trauma
d) all the above

44 The superior colliculus is a structure within the
a) hindbrain.
b) midbrain.
c) telencephalon.
d) diencephalon.

45 The superior colliculus is part of a group of distinct bumps on the _____ of the midbrain known as the corpora quadrigemini.
a) tegmentum
b) tectum
c) internal capsule
d) mammalary bodies

46 The pons is part of the
a) diencephalon.
b) mesencephalon.
c) metencephalon.
d) myelencephalon.

47 What kind of information is carried by the ventral roots of the spinal cord?
a) Motor information to muscles
b) Sensory information from muscles and skin
c) Both motor and sensory information
d) Pain information

48 The major function of Schwann cells is
a) transmission of nutrients to neurons.
b) myelination of peripheral nerve fibers.
c) scavenging cellular debris.
d) myelination of axons in the brain.

49 The physiological activity of the brain can be visualized using
a) PET
b) CT
c) MRI
d) electron microscopy
e) X-ray

50 The ventricular system contains
a) the circle of Willis.
b) blood.
c) cerebrospinal fluid.
d) the meninges.

51 The structures of the limbic system are particularly implicated in
a) emotion and learning.
b) sensation.
c) motor control.
d) sympathetic nervous system control.

52 A major pathway interconnecting the two hemispheres of the telencephalon is/a
a) the meninges
b) internal capsule
c) the corpus callosum
d) the reticular formation

53 The "giant" axons of some invertebrate animals are so large, because
a) they are heavily myelinated
b) they must conduct very slowly
c) they must conduct rapidly, but are not myelinated
d) Both a & b
e) None of the above

54 Dendrites are
a) a type of glial cell.
b) the input zone of a nerve cell.
c) the output zone of a nerve cell.
d) small cerebellar neurons.

55 Which neuroanatomical method provides an outline of entire neurons, including processes (axons and dendrites)?
a) Nissl stain
b) Autoradiography
c) Golgi stain
d) Immunocytochemistry

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c) Golgi stain
d) Immunocytochemistry

56 Myelin is found along the length of
a) Some axons of vertebrates.
b) Some axons of invertebrates.
c) All mammalian axons.
d) All the above

57 Which type of cell is responsible for myelination within the central nervous system?
a) Schwann cells
b) Astrocytes
c) Microglial cells
d) Oligodendrocytes
e) Radial glia

58 The basal ganglia include the
a) globus pallidus.
b) caudate nucleus.
c) putamen.
d) All of the above

59 Which type of cell gives rise to brain tumors?
a) Pyramidal cells
b) Multipolar cells
c) Glial cells
d) Granule cells

60 Which of the following statements is true of dendritic spines?
a) They are sites at which terminal buttons synapse.
b) They are outgrowths on the surface of dendrites.
c) They are neuronal structures that are modified by experience.
d) All of the above.

61 Which of the following glial cells have sucker-like extensions that contact blood vessels?
a) Oligodendrocytes
b) Astrocytes
c) Microglial cells
d) Stellate cells

62 The vast majority of neurons
a) receive inputs related to changes in the environment.
b) are classified as motoneurons.
c) are classified as sensory neurons.
d) are classified as interneurons.

63 The ridges of tissue on the convoluted surface of the cortex are called
a) gyri.
b) sulci.
c) nuclei.
d) ganglia.

64 Which region of the cortex is crucial for motor control?
a) Postcentral gyrus
b) Parietal lobe
c) Precentral gyrus
d) Prefrontal cortex

65 In general, the action potential is first initiated at the
a) synapse.
b) outer reaches of the dendrite.
c) axon hillock.
d) node of Ranvier.

66 The term hyperpolarization refers to
a) a membrane potential greater than the resting potential.
b) greater positivity inside the neuron.
c) a membrane potential less than the resting potential.
d) greater negativity outside the neuron.

67 The overall amplitude (measured from one extreme to the other) of the action potential is about
a) 70 mV.
b) −70 mV.
c) 110 mV.
d) 1 V.

68 A ligand is a
a) type of drug.
b) type of electrical stimulus.
c) cholinergic synapse.
d) substance that binds to receptor molecules at the surface of the cell.

69 Postsynaptic potentials are a type of
a) digital event.
b) action potential.
c) resting potential.
d) graded potential.

70 Norepinephrine and dopamine are examples of transmitters whose synaptic activity is terminated by
a) passive diffusion.
b) reuptake.
c) depolarization.
d) calcium influx.

71 The specialized presynaptic membrane receptors that remove molecules of transmitter from the synapse are called
a) translators.
b) transponders.
c) transporters.
d) ligand-gated channels.

72 The greater the influx of calcium into the presynaptic axon terminal, the greater the
a) magnitude of inhibition.
b) release of neurotransmitter.
c) amplitude of the action potential.
d) rate of reuptake.

73 The "lock and key" analogy relates to the
a) action of transmitter molecules on receptor proteins.
b) activation of the nerve impulse.
c) degradation of transmitter molecules by enzymes.
d) binding of G proteins to transmitter receptors.

74 Ion channels are made of
a) protein.
b) polysaccharide.
c) lipid.
d) carbohydrate.

75 Those historical figures, such as Eccles, who argued that synaptic transmission was electrical, not chemical, are largely redeemed with the discovery of these types of synapses.
a) tight junctions
b) axon-axonal junctions
c) gap junctions
d) axon-somatic junctions
e) direct connections, with each cell sharing intracellular fluid with all others

76 Most IPSPs are attributable to the
a) opening of sodium channels.
b) closing of potassium channels.
c) opening of chloride channels.
d) None of the above

77 It appears that the highest frequency of action potentials that an axon is capable of transmitting is
a) 120 per second.
b) 100 per second.
c) 1200 per minute.
d) 1200 per second.

78 Endogenous substances that bind to receptors and change the way they respond to transmitters are called
a) neuroregulators.
b) ligands.
c) transporters.
d) neuromodulators.

79 Ions are atoms or molecules that carry an electric charge due to the gain or loss of
a) protons
b) electrons
c) neutrons
d) positrons

80 In the extracellular or intracellular fluid, which of the following is an anion?
a) Calcium
b) Potassium
c) Chloride
d) Both a and b

81 Much of the energy that the brain expends is used for
a) transporting sodium and potassium ions against gradients
b) synthesizing and releasing neurotransmitters
c) saltatory conduction
d) propagating local currents

82 Action potentials generally are not propagated along dendrites because they lack
a) voltage-gated ion channels.
b) sodium channels.
c) myelin.
d) mitochondria.

83 Otto Loewi's experiments were the first to demonstrate the actions of a neurotransmitter. After some memory problems, he eventually showed that the
a) heart releases vagusstoff, which affects the vagus nerve.
b) vagus nerve releases vagusstoff, which increases heart rate.
c) vagus nerve releases vagusstoff, which decreases heart rate.
d) brain releases vagusstoff, which decreases heart rate.

84 "Vagusstoff" turned out to be the transmitter,
a) epinephrine.
b) norepinephrine.
c) acetycholine.
d) dopamine.

85 As a consequence of repeated use of a drug, it may become necessary to use larger and larger doses of the drug in order to achieve the same effect. This is a consequence of the development of
a) sensitization.
b) tolerance.
c) withdrawal.
d) cross-tolerance.

86 If a newly developed drug is found to bind to dopamine receptors and activate them, the drug is best classified as a dopamine
a) antagonist.
b) ligand.
c) prototype.
d) agonist.

87 Another descriptive name that could accurately be applied to the hypothetical drug (above) is
a) antidopaminergic
b) dopaminergic
c) psychotomimetic
d) neuroleptic

88 The mushroom *Amanita muscaria* is the source of _____, which results in mild sedation and visual hallucinations. It is the oldest recreational drug in recorded history.
a) ibotenic acid
b) muscimol
c) amantidine
d) both a & b

89 Benzodiazepines, such as diazepam, appear to modulate the activity of receptors for the neurotransmitter
a) dopamine.
b) serotonin.
c) GABA.
d) acetylcholine.

90 A drug that affects the function of a receptor without impeding the access of neurotransmitter molecules to their binding sites on the receptor is a
a) nonselective agonist.
b) competitive ligand.
c) noncompetitive ligand.
d) nonselective antagonist.

91 ACh is the main transmitter used at mammalian
a) cerebral cortical synapses.
b) spinal cord synapses.
c) neuromuscular junctions.
d) visual system synapses.

92 Which of the following is not an amino acid neurotransmitter?
a) Dopamine
b) Glutamate
c) GABA
d) Glycine

93 The drug atropine _____ receptors.
a) blocks muscarinic
b) activates nicotinic
c) blocks nicotinic
d) activates muscarinic

94 Historically, an extract of the plant genus *Belladonna* used cosmetically to
a) prevent wrinkles
b) promote blushing
c) dilate the pupils
d) remedy acne

95 The anxiolytic drug Valium belongs to the class of drugs known as
a) MAO inhibitors.
b) barbiturates.
c) selective serotonin reuptake inhibitors.
d) benzodiazepines.

96 Cocaine and amphetamine both potently affect the _____ of catecholamine neurotransmitters.
a) reuptake
b) binding
c) synthesis
d) metabolism

97 The discovery that the brain contains specific receptors for manufactured opiate drugs, such as morphine, implies that the body must make an _____ substance to interact with the same receptors.
a) exogenous
b) endogenous
c) excitatory
d) extemporaneous

98 By definition, a manufactured drug that interacts with a particular type of receptor in the brain is a(n) _____ ligand.
a) exogenous
b) endogenous
c) excitatory
d) competitive

99 Curare is a drug that selectively blocks receptors for _____ mostly at neuromuscular junctions.
a) serotonin.
b) GABA.
c) acetylcholine.
d) norepinephrine.

100 In the mammalian brain, the major inhibitory neurotransmitter is
a) serotonin.
b) acetylcholine.
c) GABA.
d) glycine.

101 Botulinum toxin interferes with the release of
a) norepinephrine.
b) serotonin.
c) acetylcholine.
d) epinephrine.

102 An effect of the drug scopolamine discussed in your text, suggests that, besides its other functions, _____ plays an important role in _____.
a) dopamine; schizophrenia.
b) serotonin; depression.
c) acetylcholine; learning and memory.
d) GABA; seizures.

103 The dopamine-containing fibers of the mesolimbocortical system originate in the
a) substantia nigra.
b) locus coeruleus.
c) raphe nucleus.
d) ventral tegmental area

104 Drugs that block GABA receptors tend to provoke
a) hallucinations.
b) depression.
c) seizures.
d) sedation.

105 If drug A is found to bind to a certain type of receptor for longer than drug B, then drug A is said to have greater
a) affinity.
b) selectivity.
c) potency.
d) specificity.

106 People with alcohol addiction may develop neural degeneration and Korsakoff's syndrome mostly as a result of a dietary deficiency of
a) thiamine.
b) protein.
c) tryptophan.
d) calcium.

107 The drug methadone is used to treat people who have become addicted to
a) cocaine.
b) amphetamine.
c) alcohol.
d) heroin.

108 On occasion, chronic abusers of amphetamines have been misdiagnosed as suffering fron
a) panic disorder.
b) depression.
c) autism.
d) schizophrenia.

109 Subjective experience such as visual perception of a person or object is
a) close to an exact copy of the target stimulus
b) correlated with, but not the same as the target stimulus
c) a cellular event
d) both b & c

110 A drug that acts as an antagonist for a neurotransmitter, can also be characterized as
a) an inhibitory drug
b) an excitatory drug
c) a stimulant
d) not necessarily any of the above

111 Which lobe(s) of the brain are located superior to the lateral (Sylvian) fissure?
a) occipital
b) frontal
c) parietal
d) both b & c

112 Which of the following is/are part of the limbic system?
a) cingulate gyrus
b) amygdala
c) hippocampus
d) all of the above

113 The cerebellum is part of the _____ and is crucial for _____.
a) midbrain; repetitive motor patterns and automatic postural adjustments.
b) myelencephalon; vital functions such as respiration, heart rate, and digestive processes
c) metencephalon; rapidly executed motor plans (ballistic movements).
d) mesencephalon; sensory-motor reflexes, arousal (including reversal of sleep).

114 Although Galileo invented the first light microscope, it did not come into general use unti _____ invented it independently and popularized it.
a) Cajal
b) Leeuwenhoek
c) Golgi
d) Scheibel

124 Which of the following are NOT instances of integration by neuronal dendrites and cell bodies?
a) temporal summation of excitatory input
b) spatial summation of excitatory AND inhibitory input
c) summation of any type of synaptic input
d) none of the above.

125 Which of the following is not true about the propagation of the action potential and myelin?
a) the action potential is regenerated repeatedly
b) myelination of an axon increases the number of action potentials
c) myelination takes advantage of local currents
d) myelination is metabolically more economical

126 Sodium channels on an axon are
a) ligand-gated
b) G-protein gated
c) voltage-gated
d) protein kinase-gated

127 Which of the following is not true about local currents?
a) They trigger voltage-sensitive ion channels.
b) They are conducted almost instantaneously.
c) They are extended farther along the axon by myelin segments.
d) They are non-decremental.

128 Which of the following is not true about metabotropic synaptic transmission?
a) The transmitter receptor resides on the ion channel protein.
b) The signal requires activation of a G-protein.
c) The signal often includes other "second" messengers.
d) It is relatively slow.

129 A drug that enhances transmission by binding to a part of a receptor different from that used by the neurotransmitter
a) is an antagonist.
b) is a competitive agonist.
c) is typified by the benzodiazepine, Valium.
d) all of the above.