YR 1 NEUROSCIENCE FINAL UNIT EXAM -- May 27, 1998

CHOOSE THE SINGLE BEST ANSWER FOR QUESTIONS 1 - 100

QUESTIONS 1 - 30 ARE TO BE ANSWERED IN CONJUNCTION WITH THE SLIDES THAT WILL BE PROJECTED DURING THE EXAMINATION.

1. Destruction of this structure will result in all of the following EXCEPT:

   A. Ipsilateral intention tremor

   B. Decreased muscle tone in ipsilateral flexors

   C. Decreases coordination in ipsilateral musculature

   D. Increased deep tendon reflexes

   E. Past pointing in ipsilateral upper limb

2. Choose the INCORRECT statement regarding this structure:

   A. It receives afferents from the entorhinal cortex

   B. It communicates with neurons of the dentate gyrus

   C. It contains efferent pyramidal neurons

   D. It projects to the mammilary bodies via the fornix

   E. It projects to the septal nucleus via the fornix

3. Which function is controlled by this area?

   A. Water retention in the kidney

   B. Uterine contractions

   C. Thirst drives

   D. Parasympathetic control

   E. Heat conservation

4. Which of the following, if lesioned, would cause the greatest dysregulation of the outlined structure?

   A. Amygdala

   B. Septal area

   C. Subiculum

   D. Globus pallidus (internal segment)

   E. Head of the caudate nucleus

5. All of the following will result from a unilateral lesion of the identified structure EXCEPT:

   A. Contralateral pastpointing

   B. Contralateral intention tremor

   C. Cerebellar ataxia

   D. Contralateral adiadochokinesia

   E. Loss of equilibrium

6. Which of the following pathological states develops when this structure and parts of the frontal cortex degenerate?

   A. Alzheimer's disease

   B. Parkinson's disease

   C. Huntington's disease

   D. Gerstmann's syndrome

   E. Wallenberg's syndrome

7. The majority of the neurons in this CNS center contain which of the following neurotransmitters?

   A. Acetylcholine

   B. GABA

   C. Glutamate

   D. Serotonin

   E. Glycine

8. Identify:

   A. Posterior limb of internal capsule

   B. Anterior limb of internal capsule

   C. Optic radiations

   D. Corona radiata

   E. Anterior commissure

9. Which thalamic nucleus projects to this specific area of this gyrus?

   A. Anterior nucleus of the thalamus

   B. Dorsomedial nucleus of the thalamus

   C. Pulvinar

   D. Ventral anterior nucleus of the thalamus

   E. Ventral posterior nucleus of the thalamus

10. Neurons in this area terminate in:

   A. The rostral nucleus solitarius

   B. Ipsilateral VPM

   C. Ipsilateral submandibular ganglion

   D. Ipsilateral otic ganglion

   E. Ipsilateral geniculate ganglion

11. This area is concerned with:

   A. Auditory stimuli

   B. Eye movements

   C. Finger movements

   D. Touch from hand

   E. Speech

12. An infarct of this area would produce:

A. Conductive aphasia

B. Korsakoff's psychosis

C. Sensory aphasia

D. Global aphasia

E. Motor aphasia

13. Which of the following is the result of a unilateral lesion in this structure?

A. Bilateral hearing loses

B. Paralysis of downward gaze

C. Contralateral loss of pain and temperature on the face

D. Contralateral homonymous hemianopsia

E. Loss of recent memories

14. Identify:

A. Centromedian thalamic nucleus

B. Ventral posteromedial nucleus

C. Ventral posterolateral nucleus

D. Habenular nucleus

E. Parafascicular nucleus

15. The indicated structured is part of which of the following subdivisions of the CNS?

A. Epithalamus

B. Hypothalamus

C. Metathalamus

D. Subthalamus

E. Metencephalon

16. Axons from this nucleus will terminate in:

A. Medial geniculate nucleus

B. Inferior colliculus

C. Vestibular nuclei

D. Accessory cuneate nucleus

E. Posterior thalamic nucleus (PO)

17. The identified structure serves to interconnect which of the following homologous structures?

A. Caudate nuclei

B. Subthalamic nuclei

C. Olfactory bulbs

D. Mammillary bodies

E. Pretectal nuclei

18. A lesion involving this structure will interrupt which of the following?

A. Taste to the VPM of thalamus

B. Unconscious proprioception to the cerebellum

C. Voluntary control of facial muscles

D. Medial vestibulospinal tract

E. Auditory projections to the inferior colliculus

19. The termination of this fiber tract is:

A. Septal area

B. Mammillary nucleus

C. Periamygdaloid cortex

D. Anterior nucleus of the thalamus

E. Habenular nucleus

20. Regarding the indicated structure, which of the following is CORRECT?

A. It contains neurons which give rise to the posterior spinocerebellar tract

B. It is found in lamina VI

C. It contains preganglionic sympathetic neurons

D. It contains neurons which give rise to the anterior spinocerebellar tract

E. It contains neurons involved in pain integration

21. Destruction of the indicated structure will result in which of the following?

A. Cog-wheel rigidity

B. Chorea

C. Hemiballism

D. Tremor at rest

E. Intention tremor

22. Which of the following does NOT pertain to the indicated structure?

A. It contains axons whose cell bodies are in the retina

B. Its axons terminate in preoptic and lateral geniculate nuclei

C. It is accompanied by the posterior choroidal artery

D. It is located inferior to the cerebral peduncle

E. Its destruction will result in contralateral visual field losses

23. Identify:

A. Posterior cerebral artery

B. Superior cerebellar artery

C. Anterior inferior cerebellar artery

D. Transverse pontine artery

E. Anterior choroidal artery

24. Which of the following statements regarding the indicated area is CORRECT? It:

A. Mediates light touch sensation from the upper limb

B. Conveys pain and temperature sensation

C. Coveys both unconscious and conscious proprioception

D. Provides descending facilitation to extensor muscles

E. Conveys vibratory sense from the upper limb

25. This nucleus is innervated by all of the following EXCEPT:

A. Amygdala

B. Ventral pallidum

C. Nucleus accumbens

D. Prefrontal cortex

E. Hypothalamus

26. All of the following centers send fiber projections to the indicated structure EXCEPT:

A. Cerebral cortex

B. VA-VL

C. Intralaminar thalamic nuclei

D. Substantial nigra pars compacta

E. Dorsal raphe

27. This structure:

A. Deals with vestibular information

B. Gives rise to the dorsal spinocerebellar tract

C. Receives fine discriminatory touch from the upper limb

D. Sends axon collaterals to the emboliform and globose nuclei

E. Projects to the contralateral red nucleus and VL

28. What type of sensory information is localized to this area?

A. Visual

B. Auditory

C. Olfactory

D. Unconscious proprioception

E. Somatosensory

29. An infarct in the area indicated will result in degenerated axons in which of the following?

A. Ipsilateral anterior limb of internal capsule

B. Contralateral VA-VL thalamus

C. Contralateral VPM-VPL thalamus

D. Ipsilateral posterior limb of the internal capsule

E. Ipsilateral lumbar spinal cord

30. Bilateral destruction of this area would be expected to affect:

A. Feeding behavior

B. Parasympathetic nervous system

C. Emotions

D. Circadian rhythms

E. Endocrine system

END OF SLIDES, PLEASE CONTINUE THE EXAMINATION !!!

QUESTIONS 31 - 35 ARE RELATED TO THE FOLLOWING CASE HISTORY.

A 72 year old white female was admitted to the hospital exhibiting speech difficulties. Her speech was fluent but rather slow and halting. She would stop in the middle of a sentence as if she were searching for a word. On further examination she was found to have difficulties with writing, calculations and confusing the right and left sides of her body.

31. The findings represent a classic neurologic syndrome known as:

    A. Wernicke's aphasia

    B. Broca's aphasia

    C. Conduction aphasia

    D. Gerstmann's aphasia

    E. Prefrontal Lobe syndrome

32. Which of the following brain area(s) is(are) the most likely damaged?

    A. Left area 22 (posterior superior temporal gyrus)

    B. Left area 44 (inferior frontal gyrus)

    C. Left areas 39,40 (inferior parietal lobule)

    D. Left areas 9,10,11 (anterior frontal lobe)

    E. Left arcuate fascicle

33. Which of the following will be found also if tested?

    A. Finger agnosia

    B. Inability to copy a rectangle intersected by a triangle (constructional apraxia)

    C. Inability to turn eyes contralaterally in the horizontal plane

    D. Failure to recognize sensory stimuli on the left side of the body

    E. Astereognosia of abjects felt with the left hand

34. A patient with bilateral removal of the temporal lobes to correct seizure activity may exhibit all of the following EXCEPT:

A. Decreased emotional tone (affect)

B. Increased aggressive behavior

C. Inability to form new memories

D. Diminished olfactory perceptions

E. Inability to recognize facial expressions of emotion

35. You look up a telephone number in a telephone book, look away from the book to your cell phone, and, remembering the number you have just looked up, you dial it. The memory of the number that you dialed is considered what type of memory?

A. Reflexive memory

B. Consolidated memory

C. Associative memory

D. Classical conditioning memory

E. Working memory

36. Which of the following fiber bundles (tracts, pathways, etc.) is(are) an example of **projection fibers**?

A. Corticopontine fibers

B. Uncinate fasciculus

C. Corpus callosum

D. Arcuate fasciculus

E. B and D are correct

37. Choose the CORRECT statement:

A. Axons from the cerebellar cortex terminate in the contralateral red nucleus

B. Axons from the frontal, parietal, occipital and temporal lobes of cerebral cortex terminate as mossy fibers in the granular layer of the contralateral posterior lobe of the cerebellar hemisphere

C. Axons from paravermis Purkinje cells are excitatory to the emboliform and globose nuclei

D. Axons from the dentate nucleus neurons travel via the descending limb of the superior cerebellar peduncle and are excitatory to the basilar pontine, inferior olivary nuclei and reticular formation

E. The term "dentatorubrothalamic tract" refers to axons which arise in the dentate nucleus and terminate in the contralateral motor cortex (precentral gyrus - Brodmann's area 4)

38. In a normal resting person, the organ with the greatest oxygen consumption (per gram of tissue) and blood flow (per gram of tissue/min) is the:

A. Heart

B. Brain

C. Kidney

D. Liver

E. Skeletal muscle

39. Which of the following is the INCORRECT statement with regard to the receptor for taste?

A. Vallate papillae are located in the posterior one-third of the tongue.

B. Primary sour sensation is detected by papillae on the sides and most posterior portions of the anterior two-thirds of the tongue.

C. Parietal cells in a taste bud give rise to sustentacular and to basal cells.

D. The generator potential is elicited in the gustatory cell in response to gustatory stimuli.

E. The total number of taste buds increases at a rate of 1% per year throughout the lifespan.

40. A lesion which involves the red nucleus on one side will usually result in which of the following deficits?

A. Loss of coordinated motor activity in the musculature of the hand on the side ipsilateral to the lesion.

B. Ataxia in the upper limb opposite the side of the lesion

C. Upper motor neuron signs in the upper and lower limbs on the side opposite the lesion

D. Intention tremor in the lower limb on side of lesion

E. A tendency to fall to the side of the lesion

41. A chemical for which there is good evidence that it acts as a retrograde messenger in LTP is:

A. Dopamine

B. Calcium-calmodulin-dependent kinase

C. Nitric oxide

D. Glutamate

E. Acetylcholine

42. A 63 year old male admitted to the emergency room is extremely disoriented with respect to his whereabouts, what day and year it is, and thinks that President Kennedy is still in office. He remembers his name and also that of his wife but keeps mistaking the attending nurse for his sister. He is also very frustrated and combative. A brief neurological examination fails to reveal any specific upper motor or lower motor deficits. he does not appear to be under the influence of alcohol or drugs and, upon arrival of his wife, you learn that the patient does not have a history of these abuses. You suspect the patient is suffering from:

A. Kluver-Bucy syndrome involving bilateral degeneration of the temporal lobes

B. Damage to the posterior hypothalamus

C. Chronic loss of acetylcholine-producing basal forebrain neurons

D. Vascular accident involving the left posterior cerebral artery

E. Korsakoff's psychosis involving chronic degeneration of dorsomedial thalamus and mammillary bodies

43. Which of the following problems would you expect to see in a cervical spinal cord injured patient suffering from spinal shock?

A. Increased blood pressure

B. Tachycardia (faster heart rate)

C. Exaggerated patellar reflexes

D. Babinski sign (at least, on one side)

E. Loss of sweating from the body

44. Which of the following is the CORRECT statement with regard to the central pathway for taste?

A. SVA fibers in VII, IX and X enter into the fasciculus solitarius and terminate in the caudal solitarius nucleus.

B. Secondary taste neurons send axons both ipsilaterally and contralaterally through the dorsal tegmentum and terminate in the VPL nucleus of the thalamus.

C. Tertiary neurons send their axons through the internal capsule and terminate in the face area on the dorsolateral portion of the postcentral gyrus.

D. The primary taste area is localized in the claustrum.

E. Crude awareness of taste occurs in the thalamus but discrimination between foodstuffs occurs at cortical levels.

DIRECTIONS: Select the structures (A-K below) that are most closely associated with the statement numbered 45-46.

A. Cuneocerebellar tract
B. Dorsal spinocerebellar tract
C. Dentatorubrothalamic tract
D. Inferior cerebellar peduncle
E. Juxtarestiform body
F. Middle cerebellar peduncle
G. Olivocerebellar fibers
H. Superior cerebellar peduncle
I. Thalamic fasciculus
J. transverse pontine fibers (pontocerebellar)
K. Ventral spinocerebellar tract

45. As the axons in C near their termination they are located in this structure.

46. Structure D contains A, B, E and ____.

47. Following a "complete" injury of the spinal cord at the T_6 "level", choose the response below which best describes bladder function in the patient at 1 year post injury with the assumption that the patient has received all the appropriate medical care:

A. Normal bladder function

B. A reflexive bladder

C. Spastic bladder

D. Urine retention with overflow incontinence

E. A bladder with sensation of fullness, but no voluntary control over urination.

48. Non-rapid eye movement sleep is characterized by:

A. A fall in $PaCO_2$

B. A tendency for the breathing frequency to be reduced

C. An enhanced sensitivity to $PaCO_2$

D. Heightened ventilatory responses to hypoxemia

E. Greater skeletal muscle relaxation than REM sleep

49. A complex partial seizure (CPS) may exhibit which of the following manifestations:

A. A blank stare with impairment of awareness and responsiveness

B. Lip smacking, chewing, or swallowing movements

C. Postictal confusion and disorientation

D. All of the above are correct

E. Only A and C are correct

QUESTIONS 50 AND 51 PERTAIN TO THE FOLLOWING CASE STUDY.

A patient reported that his right jaw got tired when he had to eat anything that required more than easy chewing. His wife also added that he was having trouble with his right hand and seemed somewhat clumsy. When asked about this, the man admitted that on several occasions in the last week he had knocked a glass of water over when reaching for it. His wife suggested that this problem had begun several months ago and seemed to be getting worse.

Your examination revealed the following: diminished response to tactile, thermal and painful stimuli from the surface of the right face; weakness and slight atrophy of the masseter and temporalis muscles on the right and a tendency for the jaw to deviate to the right when protruded; past pointing and dysmetria in the right upper limb with slight tremor during active movement; difficulty in performing the heel to shin test with the right leg but no problem when using the left; able to perform tandem gait with some difficulty.

50. In this case, the cerebellar problems could be examined by which of the following:

    A. Destruction of the right lateral funiculus at high cervical levels

    B. Partial damage to the right superior cerebellar peduncle

    C. Partial damage to the left red nucleus

    D. Destruction of the right dentatorubrothalamic tract rostral to the red nucleus

    E. Partial damage to the right flocculonodular lobe

51. Other structures in the vicinity of this lesion which also might be damaged include:

    A. The left facial nucleus

    B. The right lateral lemniscus

    C. The left vestibular complex

    D. The left trigeminal motor and sensory roots at their attachments to the lateral pons

    E. The right red nucleus

52. Downward pressure exerted on the temporal lobes may compress the uncus against the tentorial incisure. Which of the following would be least affected by this clinical problem?

A. Stria terminalis

B. Amygdala

C. Piriform cortex

D. Ventral amygdalofugal pathway

E. Septal Nucleus

53. During autonomic dysreflexia, which of the following signs/symptoms would NOT be seen in a spinal cord injured patient?

A. Pounding headache

B. Flushing and sweating of the skin (especially of head and neck)

C. Chills

D. Reduced blood pressure; systolic about 80 mm Hg

E. Nasal congestion

54. Purkinje cells in the cerebellum:

A. Receive inhibitory connections from climbing fibers

B. Discharge multiple spikes in response to a mossy fiber input

C. Excite stellate and basket cells of the molecular layer

D. Inhibit neurons in the deep cerebellar nuclei

E. Give rise to parallel fibers

55. In long term potentiation (LTP) in hippocampal slices, calcium is thought to enter the cytoplasm of the post-synaptic cell through:

A. AMPA (Kainate/Quisqualate) glutamate receptors

B. NMDA glutamate receptors

C. Serotonin receptors

D. Calcium-calmodulin dependent kinase

E. Calcium ATPase

56. Which of the following is NOT a component of Weber's syndrome (superior alternating hemiplegia)?

A. Diplopia

B. Ptosis

C. Miosis

D. External strabismus

E. Spastic hemiplegia

57. The categorical cerebral hemisphere is clearly superior to the representational hemisphere at:

A. Processing of spatial and three dimensional patterns

B. recognizing and remembering tunes of songs

C. Imaginative thinking

D. Mathematical calculations

E. Stereognosis

The diagram below is a schematic illustration of the surface of the cerebellar cortex. The darkened area indicates a lesion which destroys that area of cortex.

LEFT

58. Degenerating axons resulting from the lesion illustrated above would be present in all of the following locations EXCEPT:

    A. The right fastigial nucleus

    B. The left emboliform nucleus

    C. The right juxtarestiform body

    D. The left justarestiform body

    E. The right vestibular complex

59. Which of the following statements concerning the archicortex is(are) TRUE?

    A. It contains a variable number of layers (3-5).

    B. The hippocampus and dentate gyrus are a part of it.

    C. The cingulate gyrus is a part of it.

    D. It is the most primitive area of the cerebral cortex

    E. Both B and D are correct

60. Which of the following is NOT a branch of the basilar artery?

A. Posterior inferior cerebellar

B. Labyrinthine

C. Transverse pontine

D. Superior cerebellar

E. Posterior cerebral

61. Choose the INCORRECT function of the reticular motor control system:

A. Maintenance of upright posture

B. Screening of sensory information to the cerebellum

C. Movements that orient the body towards external events

D. Crude voluntary movements of the extremities

E. Head-turning reflex towards a stimulus

62. The electrical activity of the brain recorded by the electroencephalogram (EEG) represents:

A. The emotional state of the brain (mood and affect)

B. An integrated sum of all brain neuronal activity

C. The electrical activity in the outermost processes of cortical neurons

D. The electrical activity of the brainstem cardiovascular and respiratory centers

E. Activity in corticospinal tract axons

63. Which of the following is the CORRECT statement with regard to structural changes in the aging brain?

A. Cell loss is widespread throughout the brain

B. Substantial cell loss has been reported in medullary, pontine and hypothalamic nuclei.

C. All dendritic trees experience progressive shrinking and atrophy with increasing aging.

D. The normally aging brain retains a considerable amount of synaptic plasticity well into advanced age (up to about 80 years of age in humans).

E. Age-related synaptic remodeling has not been documented in any CNS center.

64. Choose the CORRECT statement regarding damage to the thalamus:

A. Severe unilateral lesions of the caudal thalamus produce a temporary loss of conscious proprioception from the contralateral body.

B. Bilateral lesions of the pulvinar would produce thalamic pain.

C. Unilateral lesions of the rostral thalamus can mimic basal ganglia disorders except with effects observed ipsilaterally.

D. Progressive tumors in the rostral thalamus would produce intense pain in the contralateral body even if only triggered by a small stimulus.

E. A lesion of the medial thalamus at rostral levels could hamper memory formation.

65. Choose the INCORRECT statement regarding the entorhinal cortex:

A. It is a specialized region of the parahippocampal gyrus.

B. It assembles information from limbic association cortex and sends it to the hippocampal formation.

C. It forms the uncus

D. It functions in learning and memory

E. It projects to the dentate gyrus

66. Occlusion of which of the following arteries may result in the inferior alternating hemiplegia?

A. Posterior inferior cerebellar

B. Basilar

C. Anterior inferior cerebellar

D. Anterior spinal

E. Medial striate

67. The pulvinar/lateral posterior complex of the thalamus:

A. Functions in adjustments of motor activity

B. Relays limbic information to the cingulate cortex

C. Integrates visual perceptive information from association cortex

D. Relays pain and temporal information to the somatosensory cortex

E. Relays basal ganglia information to the premotor cortex

68. Damage to the right frontal eye field (area 8) results in which of the following when examined shortly after the damage?

A. Both eyes are deviated horizontally to the left at rest

B. Both eyes are deviated to the right at rest

C. The patient cannot voluntarily look to the right

D. The patient cannot voluntarily look to the left

E. Both B and D are correct

69. Which of the following is the CORRECT statement with regard to the cortico-rubro-olivocerebellar fiber system?

A. The first component of this multisynaptic system arises primarily from the frontal cortex and terminates ipsilaterally on cells of the red nucleus.

B. Fibers originating in the red nucleus and terminating in the inferior olivary nucleus join the rubrospinal tract as they descend in the brainstem.

C. Olivocerebellar fibers cross the midline and pass to the cerebellum by way of the middle cerebellar peduncle.

D. Olivocerebellar fibers terminate as mossy fibers in the contralateral cerebellar cortex.

E. Physiological evidence indicates that this system is related to the control of discrete, skilled movements.

70. Choose the INCORRECT statement regarding functions of the reticular formation (RF):

A. Corticobulbar information is relayed to cranial motor nuclei via the RF.

B. Paleospinothalamic pain information is relayed to the thalamus via the RF.

C. The RF contains cerebellar afferent neurons.

D. The RF is involved in the voluntary process of urination

E. Inhibition of the RF produces sleep

71. In metabolic regulation of cerebral blood flow:

A. Basal vascular tone is unchanged when tissue metabolism is altered

B. Blood flow is held constant during changes in tissue metabolism

C. Blood flow and tissue metabolism are inversely related

D. Blood flow and arterial pressure are inversely related

E. Blood flow and tissue metabolism are directly related

72. Which of the following represents a unimodal sensory association cortex?

A. The parts of the cuneus and lingual gyrus on the banks of the calcarine sulcus (area 17)

B. Superior parietal lobule (areas 5 and 7)

C. Transverse temporal gyri (areas 41 and 42)

D. Postcentral gyrus (areas 3,1,2)

E. Both B and D are correct

The diagram below is a schematic illustration of the surface of the cerebellar cortex. The darkened area indicates a lesion which destroys that area of cortex.

LEFT

73. Which of the following would you expect to observe in an individual with the lesion illustrated above?

A. Dysmetria in the right lower limb

B. Falling backwards

C. Ataxia in the left lower limb

D. Intention tremor in the right upper limb

E. Left truncal ataxia

74. Select the INCORRECT completion of the statement. The limbic portion of the striatum:

A. Receives glutamate projections from limbic cortex.

B. Functions in the reinforcing effects of cocaine

C. Projects to the ventral pallidum

D. Receives fewer serotonin terminals as compared to the motor striatum

E. Influences neurotransmission in the dorsomedial thalamus

75. Which artery is usually occluded in the rostral lateral pontine syndrome?

A. Posterior inferior cerebellar

B. Anterior inferior cerebellar

C. Anterior spinal

D. Anterior choroidal

E. Superior cerebellar

76. Which of the following is the CORRECT statement with regard to the cerebellar cortex?

A. Is basically six layered, like the cerebral cortex

B. Sends descending fibers into the spinal cord to terminate

C. Contains pyramidal cells that send fibers to join the corticospinal tracts

D. Is somatotopically organized

E. Inhibit neurons in the red nucleus

77. Which of the following is the INCORRECT statement with regards to the bradykinesia found in Parkinsonism?

A. Degeneration of the pars compacta removes dopaminergic input to striatal spiny I neurons involved in the DIRECT pathway to GPi and SNr.

B. Disinhibition of GPi and SNr neurons would result in a decrease of their firing frequency.

C. Pallidothalamic and nigrothalamic fibers release increasing amounts of GABA from their terminals in VA-VL.

D. Decreased firing activity of VA-VL neurons will result in decreased activity over thalamocortical fibers projecting to motor cortical areas.

E. Decreased activity in the motor cortical areas may bring about decreased activity over the pyramidal tract and ultimately leads to bradykinesia.

QUESTIONS 78 - 80 ARE RELATED TO THE FOLLOWING CASE STUDY.

Following an automobile accident, an 18 year old white male was brought to the emergency room with head and neck lacerations. The patient was conscious and aware of his surroundings, but respira-tion was labored. A neurological exam revealed the following:

1. Babinski sign on right; normal reflexes on the left

2. Loss of pain and temperature sensation on the left side including both limbs and thoracic wall

3. Deep tendon reflexes exaggerated on the right; much less brisk on the left

4. With eyes closed, could not identify the position of either the right upper or lower limb

5. Some additional loss of pain and temperature sensation on the right near the superior border of the deltoid muscle

78. Which of the following syndromes best describes the patient's condition?

A. Central cord

B. Anterior cord

C. Cauda equina

D. Brown-Sequard

E. Conus medullaris

79. The loss of pain and temperature on the right side was most likely due to injury to:

A. Anterior corticospinal tract on the left

B. Lateral corticospinal tract on the right

C. Anterior white commissure

D. lateral spinothalamic tract on the left

E. Fasciculus cuneatus on the right

80. Failure to recognize upper and lower right limb positions indicates a lesion in the:

A. Left somatosensory cortex

B. Left VPL of the thalamus

C. Left posterior limb of the internal capsule

D. Left medial lemniscus

E. Right fasciculus cuneatus and fasciculus gracilis

81. Hippocampal sclerosis:

A. Is an uncommon cause of temporal lobe epilepsy

B. Is characterized by neuronal cell loss and gliosis in certain regions(sectors) of the hippocampus with relative preservation of other regions

C. Can be associated with other structural lesions (dual pathology)

D. All of the above are correct

E. Only B and C are correct

82. Transection of the fornix would effect all of the following <u>EXCEPT</u>:

A. Acetylcholine innervation to the hippocampal formation

B. Subicular efferents to the mammillary bodies

C. Ammon's horn efferents to the orbitofrontal gyrus

D. Dentate efferents to septal nuclei

E. Mammillothalamic transmission to the anterior thalamic nucleus

83. Language and speech require the participation of both Wernicke's area and Broca's area with the following connection between them. The:

A. Thalamocortical tract

B. Prefrontal lobe

C. Supplementary motor cortex

D. Arcuate fasciculus

E. Reticular activating formation

84. Choose the INCORRECT statement regarding the anterior thalamic nucleus.

A. It receives afferent projections from the mammillary nucleus.

B. It projects primarily to the paracentral lobule via the anterior limb of the internal capsule.

C. It is involved in memory formation.

D. It is a member of the limbic thalamus.

E. It connects to the reticular thalamic nucleus.

85. Which of the following is the CORRECT statement with regard to the pathophysiology of chorea?

A. Pathological involvement of striatal Spiny I neurons will result in increased activity of GABA-containing fibers originating in the striatum and projecting to the external pallidal segment (GPe).

B. Increased activity of pallidosubthalamic fibers will result in increased GABA release from their terminals and inhibition of subthalamic neurons.

C. Increased firing frequency of subthalamic neurons will result in decreased activity of GPe neurons.

D. Increased activity of pallidothalamic fibers (GPi output) will result in a decreased of GABA release from their terminals in the VA-VL thalamic nuclei.

E. Decreased activity of VA-VL neurons will result in increased activity of neurons in motor cortical areas whcih give rise to the pyramidal tract.

86. Which of the following is the INCORRECT statement with regard to the corticopontocerebellar fiber system?

A. Corticopontine fibers descend and terminate entirely ipsilateral to their side of origin.

B. Corticopontine fibers terminate synaptically on neurons in the pontine nuclei.

C. Corticopontine fibers originating in the frontal lobe descend in the lateral one-fifth of the crus cerebri.

D. Pontocerebellar fibers cross the mid-line and reach the cerebellum by way of the middle cerebellar peduncle.

E. Physiological evidence indicates that these fibers are involved in the coordination of discrete skilled movements, performed with distal limb musculature.

87. The following functions would be most at risk under conditions of an invasive pituitary tumor EXCEPT:

A. Body temperature regulation

B. Regulation of circulating vasopressin

C. Peripheral visual fields

D. Sexual drives

E. Parasympathetic nervous control

88. According to recent studies of patients with hippocampal brain damage, these patients would most likely have deficits in which types of memories?

A. Episodic memory (memory of events)

B. Semantic memory (memory of facts)

C. Reflexive memory

D. Working memory

E. Classical conditioning memory

89. Which of the following is the INCORRECT statement with regard to the functions of the supraspinal motor pathways?

A. Vestibulospinal fibers (i.e., lat. vestibulospinal tract) mediate facilitation of alpha extensor spinal motor neurons involved in equilibrium responses.

B. Rubrospinal tract fibers act to facilitate alpha flexor and to inhibit alpha extensor spinal motor neurons during locomotion.

C. Tectospinal fibers act through gamma extensor spinal motor neurons which innervate neck muscles.

D. Corticospinal and rubrospinal tract fibers terminate on interneurons related to the more medially placed motor neuron groups of the spinal cord.

E. Anterior reticulospinal tract fibers strongly facilitate extensor tone by activation of gamma extensor spinal motor neurons.

90. If the radius of a cylindric tube is tripled, the laminar flow of a fluid through the tube will:

A. Not be affected

B. Increase three fold

C. Increase six fold

D. Increase nine fold

E. Increase 81 fold

QUESTIONS 91 AND 92 PERTAIN TO THE CASE STUDY BELOW.

An 18 year old white male is brought to the ER following an automobile accident. Neurological exam reveals the following:

1. Bilateral loss of pain and temperature in the T_7 dermatome with additional loss of this sensation in the left lower thorax and left lower limb.

2. Failure to recognize position of right lower limb with eyes closed, but could identify the position of both upper limbs and left lower limb.

3. Spastic paralysis of right lower limb, but right upper limb appeared to be normal.

91. Based on the results of the neurological exam reported above, what would you predict would be the result of a test for pain and temperature sensation in the patient's left thumb?

A. Normal sensation

B. Complete absence of an ability to detect pain and temperature

C. Abnormal sensations (paraesthesia)

D. Able to detect pain, but not temperature

E. Able to detect temperature only

92. The bilateral loss of pain and temperature in the T_7 dermatome indicates a lesion that involves which segment(s) of the spinal cord?

A. T_4

B. T_6

C. T_7

D. T_8

E. T_{11}

93. Select the INCORRECT completion of the statement. The suprachiasmatic nucleus:

A. Receives direct retinal inputs

B. Is located in the anterior hypothalamus

C. Influences uterine contractions during labor

D. Is located at the level of the optic chiasm

E. Influence cyclic patterns of corticosteroid release

94. The following controlling centers are found within the pontine reticular formation EXCEPT:

A. Reticulospinal motor center

B. Expiration/inspiration center

C. Micturition center

D. Apneustic center

E. Pain relay center

95. An inferior alternating hemiplegia is characterized by which of the following combination of signs and/or symptoms?

A. Ipsilateral internal strabismus and contralateral spastic hemiparesis.

B. Ipsilateral external strabismus and contralateral spastic hemiparesis.

C. Ipsilateral uvula deviation and contralateral spastic hemiparesis.

D. Ipsilateral tongue deviation and contralateral spastic hemiparesis.

E. Ipsilateral lower facial paralysis and contralateral spastic hemiparesis.

96. Select the CORRECT hypothalamic area : function match.

A. Lateral hypothalamus : regulation of the parasympathetic nervous system

B. Posterior hypothalamus : heat dissipation center

C. Lateral hypothalamus : food satiety center

D. Posterior hypothalamus : sodium detectors

E. Anterior hypothalamus : sexual drives

QUESTIONS 97-99 ARE RELATED TO THE FOLLOWING ILLUSTRATED DIAGRAM ON THE FOLLOWING PAGE.

97. A lesion that destroys the diagonally hatched area includes which of the following structures?

A. Medial lemniscus

B. Cranial nerve 6

C. Cranial nerve 7

D. Cranial nerve 12

E. Inferior cerebellar peduncle

98. Which of the following is the CORRECT sign or symptom found in this lesion?

A. Diplopia

B. Ipsilateral external(lateral) strabismus

C. Horizontal nystagmus

D. Inability to smile ipsilaterally

E. Deviation of the tongue to the side of the lesion

99. Which of the following defines the CORRECT level of the lesion?

A. Dorsolateral rostral medulla

B. Ventromedial mid medulla

C. Ventromedial caudal pons

D. Ventrolateral mid pons

E. Midbrain tegmentum

100. A lesion in the corticobulbar tract at the level of the midbrain crus cerebri will bring about which of the following?

A. Diplopia

B. Inability to smile on the contralateral side of the face

C. Inability to wrinkle the forehead on the ipsilateral face

D. Ipsilateral abnormal plantar reflex

E. Inability to turn the head to the side contralateral of the lesion