

YR 1 NEUROSCIENCE FINAL UNIT EXAMINATION -- May 28, 1997

CHOOSE THE SINGLE BEST ANSWER FOR QUESTIONS 1 - 100.

1. Identify this space:
 - A. Interpeduncular fossa
 - B. Cerebral aqueduct
 - C. 4th ventricle
 - D. Preoptic recess
 - E. 3rd ventricle

2. Damage to this structure results in:
 - A. Bilateral clumsiness of both upper limbs
 - B. The inability to adduct the ipsilateral eye
 - C. A restriction of vertical upgaze eye movements
 - D. A hearing loss in the contralateral ear
 - E. None of the above

3. Axons terminating in this nucleus travel in the:
 - A. Ipsilateral dorsal spinocerebellar tract
 - B. Ipsilateral fasciculus cuneatus
 - C. Ipsilateral spinal tract of V
 - D. Contralateral ALS
 - E. Ipsilateral anterior spinocerebellar tract

4. This brain area receives afferent fiber projections by way of which of the following tracts?
 - A. Rubrospinal
 - B. Lateral spinothalamic
 - C. Posterior spinocerebellar
 - D. Lateral lemniscus
 - E. Fasciculus cuneatus

5. Choose the INCORRECT statement regarding this structure:
- A. It is involved in the formation of memories
 - B. It receives projections from the anterior thalamic nucleus
 - C. It projects to the parahippocampal gyrus
 - D. It receives projections from the subiculum
 - E. It is part of the limbic cortex
6. What is the name of the "branchial motor" nucleus in this region?
- A. Intermediolateral nucleus
 - B. Accessory nucleus
 - C. Nucleus dorsalis
 - D. Nucleus proprius
 - E. Inferior salivatory nucleus
7. Destruction of this structure will produce what clinical syndrome?
- A. Choreoathetosis
 - B. Hemiballism
 - C. Parkinson's disease
 - D. Receptive aphasia
 - E. Homonymous hemianopsia
8. This structure supplies the:
- A. Ipsilateral inferior rectus muscle
 - B. Ipsilateral lateral rectus muscle
 - C. Ipsilateral tongue muscles
 - D. Contralateral superior oblique muscles
 - E. Ipsilateral medial rectus muscle

9. This structure projects to the hypothalamus by way of which of the following fiber tracts?
- A. Fornix
 - B. Stria terminalis
 - C. Cingulum
 - D. Stria medullaris thalami
 - E. Uncinate fasciculus
10. A lesion destroying this area will result in:
- A. Degeneration of the ipsilateral chewing muscles
 - B. Difficulty with swallowing and hoarseness of voice
 - C. Loss of taste sensibility from the anterior two-thirds of the tongue
 - D. Contralateral deviation of the tongue when protruded
 - E. Loss of pain and temperature from ipsilateral body
11. Choose the INCORRECT statement regarding this structure:
- A. It receives afferents from the entorhinal cortex
 - B. It communicates with neurons of Ammon's horn
 - C. It projects to the mammillary bodies via the fornix
 - D. It is the dentate gyrus of the hippocampal formation
 - E. It receives acetylcholine information from the septal nucleus
12. What is the name of the afferent pathway that terminates in this nucleus?
- A. Stria medullaris thalami
 - B. Stria terminalis
 - C. Habenulopeduncular tract
 - D. Mammillothalamic tract
 - E. Dorsal longitudinal fasciculus

13. Identify:
- A. Posterior cerebellar artery
 - B. Superior cerebral artery
 - C. Posterior communicating artery
 - D. Middle cerebral artery
 - E. Internal carotid artery
14. This structure represents:
- A. The primary visual cortex
 - B. The unimodal association cortex for olfaction
 - C. The primary somatic sensory cortex
 - D. The face area of the primary motor cortex
 - E. The primary auditory cortex
15. This structure sends fiber projections primarily to which of the following brain areas?
- A. Prefrontal lobe
 - B. Cingulate gyrus
 - C. Parahippocampal gyrus
 - D. Transverse temporal gyri (areas 41 and 42)
 - E. Striatum
16. This structure contains axons from:
- A. The globose and emboliform nuclei
 - B. The vestibular and hypoglossal nuclei
 - C. Vagal and accessory cuneate nuclei
 - D. The red nucleus and rostral nucleus solitarius
 - E. The inferior olivary and VPM nuclei

17. Choose which function is NOT controlled by this area?
- A. Water retention in the kidney
 - B. Uterine contractions
 - C. Heat conservation
 - D. Parasympathetic control
 - E. Thirst drives
18. Destruction of this nucleus will result in which of the following deficits?
- A. Loss of 2-pt tactile discrimination in the contralateral body
 - B. Bilateral loss of hearing, but more predominant contralaterally
 - C. Contralateral homonymous hemianopsia
 - D. Contralateral spastic paralysis
 - E. Contralateral superior quadrantanopsia
19. Identify:
- A. Putamen
 - B. Anterior nucleus of thalamus
 - C. Dorsomedial nucleus of thalamus
 - D. Body of caudate
 - E. Globus pallidus
20. This structure is involved in the:
- A. Visual reflex pathways
 - B. Auditory pathways
 - C. Taste pathways
 - D. Control of eye movements
 - E. Control of voluntary limb movements

21. All of the following send fiber projections to this structure EXCEPT:
- A. Motor cortex (area 4)
 - B. Dorsal raphe nucleus
 - C. Substantia nigra pars compacta
 - D. Internal pallidal segment
 - E. Centromedian-parafascicular complex
22. Axons arising from this area will terminate in the:
- A. VPL
 - B. Superior olivary nucleus
 - C. Abducens nucleus
 - D. Inferior colliculus
 - E. Facial motor nucleus
23. Bilateral destruction of this area, at this level would be expected to affect all the following EXCEPT:
- A. Feeding behavior
 - B. Parasympathetic nervous system
 - C. Emotions
 - D. Endocrine system
 - E. Circadian rhythm
24. Identify the nucleus located in this region:
- A. Ventroposterior medial (VPM)
 - B. Parafascicular
 - C. Centromedian
 - D. Lateral dorsal
 - E. Pulvinar

25. The fibers in this structure originates primarily from the:
- A. Olfactory bulb
 - B. Anterior nucleus of the thalamus
 - C. Amygdala
 - D. Oculomotor nucleus
 - E. Subiculum
26. This region is necessary for:
- A. Comprehension of spoken language
 - B. Motor production of speech
 - C. The voluntary motor control of the contralateral upper limb
 - D. The ability to perform high level calculations
 - E. Voluntary eye movements
27. Destruction of this structure will result in which of the following?
- A. Cogwheel rigidity
 - B. Jack-knife spasticity
 - C. Extensor plantar reflex
 - D. Hemiballism
 - E. Intention tremor
28. Which choice best describes this structure?
- A. It projects to the ipsilateral VA
 - B. It is inhibitory to the vestibular nuclei bilaterally
 - C. It deals with muscle tone in the ipsilateral flexor muscles
 - D. It receives both excitatory and inhibitory afferents
 - E. A lesion which destroys it results in contralateral intention tremor

29. All of the following structures are located here EXCEPT:
- A. Amygdala
 - B. Nucleus Basalis
 - C. Ventral Basal Ganglia
 - D. Suprachiasmatic Nucleus
 - E. Preoptic Nucleus
30. Which of the following axon pathways is NOT FOUND at this spinal cord level?
- A. Lateral corticospinal
 - B. Posterior spinocerebellar
 - C. Lateral spinothalamic
 - D. Rubrospinal
 - E. Reticulospinal

END OF SLIDE QUESTIONS

31. A lesion involving the left inferior cerebellar peduncle will result in which of the following:
- A. Loss of muscle tone in the flexor muscles on the right side of the body.
 - B. Spastic paralysis on the left side
 - C. Intention tremor in the left upper limb
 - D. Ataxia of the left lower limb
 - E. Adiadochokinesis of the left hand
32. A simple partial seizure (SPS) or "aura" involving the medial temporal lobe (uncus, amygdala, and hippocampus) might be manifested by all of the following symptoms EXCEPT:
- A. A disagreeable smell (olfactory hallucination)
 - B. A feeling of intense familiarity (deja vu)
 - C. An unprovoked sudden feeling of fear
 - D. Hearing noises or sounds (auditory hallucination)
33. Choose the INCORRECT series of connections regarding limbic system circuitry.
- A. Entorhinal cortex to dentate gyrus to Ammon's horn
 - B. Subiculum to mammillary bodies to anterior thalamic nucleus
 - C. Anterior thalamic nucleus to cingulate gyrus to entorhinal cortex
 - D. Subiculum to entorhinal cortex
 - E. Ammon's horn to mammillary bodies to orbitofrontal cortex

34. All of the following are components of the epithalamus EXCEPT:
- A. Stria medullaris thalami
 - B. Medial geniculate body
 - C. Pineal gland
 - D. Epithelial roof of the 3rd ventricle
 - E. Habenular nucleus
35. The range of perfusion pressures over which autoregulation of cerebral blood flow occurs will be approximately:
- A. 30 - 110 mm Hg
 - B. 40 - 120 mm Hg
 - C. 60 - 150 mm Hg
 - D. 80 - 180 mm Hg
 - E. 110 - 200 mm Hg
36. The most common cause of temporal lobe epilepsy is:
- A. Brain tumor
 - B. Hippocampal sclerosis
 - C. Prior stroke damaging the temporal lobe
 - D. A vascular malformation such as a cavernous angioma
 - E. None of the above

THE FOLLOWING CASE STUDY MAY BE USED TO ANSWER QUESTION 37 - 39.

A patient with a bullet wound to the head is referred to you for neurological examination. Upon entering the hospital room you find the patient on a respiratory and cardiac monitor. You have difficulty arousing the patient and once awake you note the following: Right pupil is constricted; there is medial strabismus of the right eye and upon attempted right lateral gaze the left eye fails to adduct; loss of pain and temperature sensitivity on the right side of the face and left side of the body; deafness of the right ear; a pronounced intention tremor in the right arm and leg. The deep tendon reflexes on the right side are not as brisk as those on the left and there appears to be a complete facial paralysis on the right side.

37. The likely site for this lesion is:
- A. The left internal capsule
 - B. The right caudal pons
 - C. The left cerebellar hemisphere
 - D. The left side of the midbrain at the level of the superior colliculus
 - E. The right side of the medulla at the level of the dorsal column nuclei
38. The inability of the left eye to adduct upon attempted right lateral gaze is the result of destruction of the:
- A. Right spinal tract of V
 - B. Right MLF between the IV and III cranial nerve
 - C. Lateral reticular formation on the right side
 - D. Right superior cerebellar peduncle
 - E. Right abducens nucleus
39. All of the following structures would be damaged in this lesion EXCEPT the:
- A. Cochlear nuclei on the right
 - B. Spinal tract of V on the right
 - C. Facial motor nucleus on the right
 - D. Vestibular nuclei on the right
 - E. Descending sympathetic pupillodilator fibers

40. Which of the following BEST explains the lack of spontaneous activity in the striatum when the animal (or person) is not moving?
- A. Centromedian-parafascicular neurons project axons which inhibit striatal medium spiny neurons.
 - B. Subthalamic nucleus neurons project glutamate-containing fibers which terminate on striatal inhibitory interneurons.
 - C. Overall excitation mediated by striatal afferents is counteracted by GABA inhibition mediated by axon collaterals of striatal medium spiny neurons and striatal interneurons.
 - D. Glutamate released by axon collaterals of medium spiny neurons is counteracted by GABA inhibition mediated by striatal interneurons.
 - E. Overall glutamate excitation mediated by striatal afferents from the cerebral cortex is counteracted by GABA inhibition mediated by striatal afferents which originate in the substantia nigra.
41. The superior cerebellar peduncle projects to which of the following thalamic nuclei?
- A. Anterior
 - B. Ventral anterior
 - C. Ventral lateral
 - D. Ventral posterior
 - E. Pulvinar
42. Choose the INCORRECT structure: function match regarding hypothalamic nuclei.
- A. Suprachiasmatic nucleus : circadian biorhythms
 - B. Arcuate nucleus : vasopressin release into the posterior pituitary gland
 - C. Preoptic Area : sexual behavior
 - D. Paraventricular nucleus : oxytocin release into the posterior pituitary gland
 - E. Mammillary nucleus : short-term memory formation

43. Occlusion of which of the following arteries would cause:
1. Contralateral spastic paralysis
 2. Contralateral loss of fine discriminatory sensation (but sparing the face)
 3. Paralysis of the ipsilateral side of the tongue
- A. Posterior inferior cerebellar artery
 - B. Anterior spinal artery
 - C. Anterior inferior cerebellar artery
 - D. Anterior choroidal artery
 - E. Posterior choroidal artery
44. Which of the following is the INCORRECT statement with regard to the terminology and location of basal ganglia centers?
- A. The corpus striatum includes the caudate nucleus, the putamen and the two segments (external and internal) of the globus pallidus.
 - B. The ansa lenticularis is composed of fiber projections originating in the internal pallidal segment.
 - C. The lentiform nucleus is composed of the putamen plus the two (external and internal) pallidal segments.
 - D. The pedunculo pontine tegmental nucleus (PPTg) is located at the level of the superior colliculus (rostral midbrain).
 - E. The striatum is composed of the caudate and the putamen

45. Choose the INCORRECT statement regarding the functions of the reticular formation.
- A. The reason that emotions can influence autonomic functions such as heart rate and respiration is because the reticular formation relays limbic information to brainstem and spinal cord autonomic centers.
 - B. Somatosensory information on pain and temperature is relayed to the thalamus by the reticular formation.
 - C. Axons from a nucleus located within the medullary reticular formation can be found in the cerebellum.
 - D. Medullary and pontine reticular formation originate motor pathways to the spinal cord that ensure the automatic orientation of the head and body toward a stimulus.
 - E. Sleep involves the shutdown of caudal regions of the reticular formation.
46. The representational cerebral hemisphere is:
- A. Specialized for language function in most individuals
 - B. The left hemisphere in most left handed individuals
 - C. The site of lesions in most patients with aphasia
 - D. The right hemisphere in most right handed individuals
 - E. The hemisphere with greater mathematical abilities
47. Which of the following is the CORRECT statement with regard to Parkinson's disease?
- A. Cell loss of the striatal medium spiny neurons
 - B. Decreased acetylcholine levels in the striatum
 - C. Decreased firing of GPi neurons
 - D. Amelioration (improvement) of symptoms after acetylcholine agonist administration
 - E. Tendency to write progressively smaller (micrographia)

48. Following a low cervical spinal cord injury, which of the following would most likely be seen in a patient suffering from spinal shock?
- A. Inability to speak
 - B. Increased deep tendon reflexes
 - C. Babinski sign
 - D. Decreased blood pressure
 - E. Spastic (automatic) bladder
49. Which of the following is the INCORRECT statement with regard to the cortico-rubro-olivo-cerebellar system?
- A. Cortico-rubral fibers terminate ipsilaterally in the red nucleus.
 - B. Rubro-olivary fibers project ipsilaterally to the inferior olivary nucleus.
 - C. Rubro-olivary fibers descend in the brainstem by way of the central tegmental tract.
 - D. Olivocerebellar fibers project ipsilaterally to the cerebellar cortex by way of the inferior cerebellar peduncle.
 - E. Olivocerebellar fibers terminate as climbing fibers in the cerebellar cortex.
50. Which EEG rhythm predominates in a healthy individual during supine relaxation with the eyes closed?
- A. Delta
 - B. Theta
 - C. Beta
 - D. Alpha
 - E. Spindling

51. Choose the CORRECT statement regarding the hypothalamic control of thirst drives.
- A. Vasopressin neurons contain osmoreceptors that detect sodium levels
 - B. Lesions of the lateral hypothalamus at mid-hypothalamic levels increase water consumption
 - C. Ethanol increases vasopressin release in the posterior pituitary gland
 - D. Low blood volume is detected by vasopressin neurons that secrete angiotensin II
 - E. Diabetes insipidus results from the destruction of hypothalamic vasopressin neurons
52. Intention tremor can occur with:
- A. Superior cerebellar peduncle lesions
 - B. Vestibular complex lesions
 - C. Cerebral cortical lesions
 - D. Dorsal column nuclear lesions
 - E. Substantia nigra, pars compacta lesions
53. In a Brown-Sequard syndrome, bilateral loss of pain and temperature sense in a specific dermatome would most likely be caused by:
- A. Bilateral destruction of the lateral spinothalamic tracts
 - B. Destruction of the dorsal roots on one side and destruction of the lateral spinothalamic pathway on the other side
 - C. Destruction of the right lateral funiculus and left dorsal funiculus
 - D. Destruction of the right lateral funiculus and left anterior funiculus
 - E. Destruction of the anterior white commissure

54. Choose the CORRECT pair relating fiber projections from the basal ganglia with their corresponding neuroactive substance(s).
- A. Subthalamic nucleus efferents to the GPi -- GABA
 - B. Striatal efferents to SNr -- GABA + enkephalin
 - C. GPi efferents to VA-VL -- glutamate
 - D. GPe efferents to subthalamic nucleus -- glutamate
 - E. SNr efferents to VA-VL -- GABA
55. A patient presents with a right hemiparesis. Which of the following findings on examination allows you to "localize the lesion" (i.e., reach an anatomic diagnosis)?
- A. Decreased perception of pain (hypalgesia) on the right side of the body
 - B. Broca's (non-fluent, expressive) aphasia
 - C. Increased deep tendon reflexes in the right upper and lower limbs
 - D. Right plantar extensor reflex
 - E. None of the above
56. Choose the INCORRECT match regarding the amygdala.
- A. The basolateral amygdala attaches an emotional significance to a stimulus
 - B. The central nucleus controls drive-related behaviors triggered by the sense of smell.
 - C. The bed nucleus of the stria terminalis is involved in anxiety disorders.
 - D. The corticomedial nucleus is reciprocally connected with the olfactory system and hypothalamus.
 - E. The basolateral amygdala functions in the production of fear.

57. The initial neural activity in the planning of a skilled voluntary movement occurs in the:
- A. Lateral cerebellar hemisphere
 - B. Basal ganglia
 - C. Pontine nuclei
 - D. Cortical association areas
 - E. Primary motor cortex

THE FOLLOWING CASE HISTORY PERTAINS TO QUESTIONS 58 -62.

Following an automobile accident, an eighteen year old white male was hospitalized for several weeks. A neurological exam at that time revealed the following:

1. Complete loss of conscious proprioception in the right lower limb.
 2. Babinski sign on the right.
 3. Inability to detect pain and temperature sensation on the medial side of the antecubital fossa (medial epicondyle) on both upper limbs.
 4. Inability to detect pain and temperature at the apex of the left axilla, in all the intercostal spaces on the left, and in the left lower limb.
 5. The patient could feel a gentle squeezing of both thumbs, right and left middle fingers, and the left little finger.
 6. No sensation to squeezing could be detected in the right little finger.
58. Based on this exam, a single lesion may be found at which of the following levels?
- A. Caudal medulla in the midline
 - B. Right side of the spinal cord at C₈
 - C. Left side of the spinal cord at T₁
 - D. Right side of the spinal cord at C₄ - C₅
 - E. Left side of the spinal cord at C₄ - C₅
59. Based on the exam, which of the following might also be observed (predicted) in this patient?
- A. Complete loss of tactile sense in the right lower limb.
 - B. Increased patella reflex on the right
 - C. Loss of pain and temperature sensation in all of the intercostal spaces on the right
 - D. Clonus in the left lower limb.
 - E. None of the above are predictable based on the neurological exam.

60. Intact sensory capability in both thumbs suggests that if this were a spinal cord injury, the injury would likely be caudal to:
- A. C5
 - B. C6
 - C. C7
 - D. C8
 - E. T1
61. The loss of pain and temperature sensation on the left side of the thorax and left lower limb was most likely due to destruction of:
- A. The right lateral corticospinal tract
 - B. The left lateral spinothalamic tract
 - C. The left lateral corticospinal tract
 - D. The right lateral spinothalamic tract
 - E. The right anterior spinothalamic tract
62. In addition to all of the above findings in the neurological exam, if this patient reported some "crude" (light) sensory capability in the right lower limb, this would suggest:
- A. That the right dorsal funiculus is not completely destroyed at the site of the lesion.
 - B. That the left dorsal funiculus is not completely destroyed at the lesion site
 - C. That the right lateral funiculus is not completely destroyed at the lesion site
 - D. That the left lateral funiculus is not destroyed at the lesion site
 - E. That the right anterior funiculus is not completely destroyed at the lesion site

THE FOLLOWING CASE HISTORY PERTAINS TO QUESTIONS 63 -66.

A 65 year old black female was referred to a neurologist for evaluation of a movement disorder. Over the last 3 years the patient had noticed progressive stiffness of the muscles in both upper and lower limbs. She had also noted difficulty in getting up from a chair and maintaining proper posture. Her movement disorder consisted of a 3 - 6 beats per second tremor at her right wrist and fingers; however, no tremor was found on the left upper limb.

63. Given the combination of signs and symptoms which of the following best describes this disorder?
- A. Hemiballism
 - B. Huntington's disease
 - C. Parkinson's disease
 - D. Tourette syndrome
 - E. Posterior cerebellar lobe syndrome
64. Which of the following is the CORRECT statement with regard to the movement disorder?
- A. It diminishes (improves) when the patient is excited.
 - B. It is present while the patient is asleep.
 - C. It occurs when the patient executes volitional movement.
 - D. It is associated with hyperkinesia
 - E. None of the above
65. Which of the following will be noted by the neurologist if tested?
- A. Jack-knife spasticity
 - B. Cogwheel rigidity
 - C. Dysdiadochokinesia
 - D. Positive Romberg sign
 - E. Right extensor plantar reflex

66. Her right tremor indicates involvement of which of the following brain structures?
- A. Left cortical motor areas
 - B. Right superior cerebellar peduncle caudal to its decussation
 - C. Left superior cerebellar peduncle rostral to its decussation
 - D. Right red nucleus
 - E. Left subthalamic nucleus
67. Lower lateral pontine syndrome will result in all of the following functional deficits EXCEPT:
- A. Facial paralysis (ipsilateral)
 - B. Decreased salivation
 - C. Nystagmus to the opposite side
 - D. Contralateral spastic paralysis
 - E. Deafness (ipsilateral)
68. An individual with a lesion limited to the flocculonodular lobe on the right side will likely exhibit which sign or symptom?
- A. Intention tremor in the muscles of the right upper limb
 - B. Decerebrate rigidity in the limbs on the right side
 - C. Truncal ataxia to the right side
 - D. Decreased flexor muscle tone on the limbs on the right side
 - E. Cogwheel rigidity in the limb muscles on the left side.

69. The EEG is NOT useful in the diagnosis of:
- A. Seizures
 - B. Cranial neoplasms
 - C. Headache and migraine
 - D. Stroke
 - E. Coma

MATCHING ITEMS

In each of the following groups there are two numbered lists. Mark on the answer sheet in the line corresponding to each question number in the lower list (70-75) the letter of the related item of the upper list.

DIRECTION: Select the option (A-N below) which best fits the description numbered 70-75.

- A. Mammillary bodies
- B. Basolateral amygdala
- C. Hippocampal formation
- D. Cingulate gyrus
- E. Nucleus basalis (of Meynert)
- F. Lateral hypothalamic nucleus
- G. Ventral pallidum
- H. Prefrontal cortex
- I. Ventromedial hypothalamic nucleus
- J. Anterior thalamic nucleus
- K. Septal nucleus
- L. Nucleus accumbens
- M. Bed nucleus of the stria terminalis
- N. Posterior parietal cortex

- 70. If lesioned bilaterally, would result in a loss of the ability to form short-term memories following bilateral removal of temporal lobes to cure intractable epilepsy.
- 71. If lesioned bilaterally, would likely result in weight gain and increased aggression.
- 72. Sustains major damage in Alzheimer's disease.
- 73. During Huntington's disease, the loss of this structure would contribute to cognitive decline, dementia, and psychosis.
- 74. Often destroyed in Korsakoff's psychosis (amnesic confabulatory syndrome).
- 75. Bilateral destruction of this center may cause aphagia.

76. Which of the following is the CORRECT statement with regard to the function of the anterior reticulospinal tract?
- A. Acts primarily to facilitate alpha flexor motoneurons in the spinal cord.
 - B. Inhibits alpha flexor motor neurons
 - C. Facilitates gamma extensor motor neurons
 - D. Inhibits gamma flexor motor neurons
 - E. Inhibits alpha extensor motor neurons
77. Which of the following drugs are helpful to control the chorea of patients with Huntington's disease?
- A. Dopamine agonist
 - B. Dopamine antagonist
 - C. DOPA decarboxylase inhibitor
 - D. GABA antagonist
 - E. Acetylcholine antagonist
78. Regarding afferents and efferents of the cerebellum, all are CORRECT EXCEPT:
- A. The juxtarestiform body contains both afferents and efferents
 - B. The dorsal spinocerebellar tract conveys axons from Clarke's nucleus
 - C. The cuneocerebellar tract arises in the medulla
 - D. The middle cerebellar peduncle conveys axons from the basilar pons to the cerebellar cortex.
 - E. Axons from the globose and emboliform nuclei terminate in the contralateral VA.

79. Choose the INCORRECT sequence:
- A. Red nucleus-inferior olivary nucleus-deep cerebellar nuclei and cerebellar cortex
 - B. Paravermal Purkinje cell axon-globose nucleus-red nucleus
 - C. Dentate nucleus-ventral lateral (VL) nucleus-motor cortex
 - D. Basilar pontine gray-emboliform nucleus-vermis
 - E. Nodulus Purkinje cell axons-vestibular nuclei-lateral vestibulospinal tract
80. Which of the following fiber bundles (tracts, pathways, etc.) is(are) an example of **association fibers**?
- A. Corticopontine fibers
 - B. Uncinate fasciculus
 - C. Corpus callosum
 - D. Fornix

QUESTIONS 81 -85 REFER TO THE FOLLOWING CASE STUDY.

History. This 45 year old female with valvular heart disease was admitted to the hospital because of the acute onset of weakness of her left upper and lower limbs and unusual behavior. She indicates that she is perfectly fine and doesn't know why her family brought her to the emergency room.

Examination. The patient tends to ignore objects and people located in the left half of her environment. When she is shown her left hand, she identifies it as a hand but does not recognize it as her own. She is unable to see objects in the lower half of the left visual field in either eye. She is able to wrinkle her forehead and close her eyes symmetrically on both sides, but the left side of her mouth does not move when she smiles or grimaces. Sensory testing reveals mildly diminished appreciation of pain, vibration, touch, and conscious proprioception (joint position sense) in the left face and upper limb. A mild weakness is noted in the left upper limb. Deep tendon reflexes are brisker in the left upper limb than the right, but reflexes are symmetric in the lower limbs. Plantar reflexes are flexor bilaterally. Cerebellar testing is normal.

81. Findings in this patient indicating an "upper motor neuron lesion" include:
- A. Deep tendon reflexes in the left upper limb
 - B. Deep tendon reflexes in the lower limbs
 - C. Loss of joint position sense
 - D. The plantar reflexes
82. The patient's tendency to deny her illness, to ignore her left side, and to fail to recognize her left hand:
- A. Indicate a psychiatric problem
 - B. Indicate a visual field defect such as a left homonymous hemianopsia
 - C. Indicate a lesion in the lateral aspect of the right occipital lobe (visual unimodal association cortex)
 - D. None of the above

83. Where is the lesion located?
- A. Posterior limb of the internal capsule on the right
 - B. Right upper midbrain including both cerebral peduncle and tectum
 - C. Lateral surface of the right frontal lobe
 - D. Right inferior parietal lobe
 - E. Right posterior thalamus
84. All of the following structures were directly involved in the lesion EXCEPT:
- A. Right inferior parietal lobule
 - B. Lower part of the right postcentral gyrus
 - C. Optic radiations passing through the parietal lobe
 - D. Right Meyer's loop in the temporal lobe
85. Assuming this lesion was of a vascular nature, which artery was involved?
- A. Central (penetrating) branches of the right posterior cerebral artery (posterolateral group)
 - B. Cortical branches of the right posterior cerebral artery
 - C. Right anterior choroidal artery
 - D. Branches of the right middle cerebral artery
 - E. Occlusion of the right anterior cerebral artery

QUESTIONS 86 - 87 ARE RELATED TO THE FOLLOWING CASE HISTORY.

A 49 year old white male was admitted to the emergency room with the following complaints:

- Double vision
- Gait problems
- "Shaking" of left hand when executing volitional tasks

On examination the neurologist noted the following:

- Right ptosis
- Right external strabismus
- Dysdiadochokinesia with the left hand lagging behind the right
- Past pointing with the left but not the right upper limb

86. The combination of signs and symptoms identify a lesion at which of the following brainstem levels:
- A. Right rostral midbrain
 - B. Left rostral midbrain
 - C. Right caudal pons
 - D. Left caudal pons
 - E. None of the above
87. The dysdiadochokinesia, left past pointing and left "shaking" indicated destruction of which of the following?
- A. Right superior cerebellar peduncle rostral to its decussation
 - B. Right inferior cerebellar peduncle
 - C. Right dentate cerebellar nucleus
 - D. Left superior cerebellar peduncle caudal to its decussation
 - E. Left middle cerebellar peduncle

88. 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 41)
 - D. Postcentral gyrus (areas 3, 1, 2)
89. All of the following are characteristics of a patient suffering from autonomic dysreflexia EXCEPT:
- A. Pounding headache
 - B. Flushing of the skin in head and neck area
 - C. Decreased blood pressure (60mmHg, systolic).
 - D. Chills and goose bumps
 - E. Nasal congestion
90. The efferent fibers from the cerebellar cortex to the deep nuclei are axons of which of the following neuronal types?
- A. Granule cells
 - B. Purkinje cells
 - C. Stellate cells
 - D. Golgi cells
 - E. Basket cells

91. Match the hypothalamic nucleus and its CORRECT subdivision?
- A. Posterior nucleus : lateral part of posterior hypothalamus
 - B. Ventromedial nucleus : medial part of anterior hypothalamus
 - C. Paraventricular nucleus : medial part of anterior hypothalamus
 - D. Suprachiasmatic nucleus : medial part of the middle hypothalamus
 - E. Arcuate nucleus : medial part of anterior hypothalamus
92. The efferent projection from GPi and SNr to the PPTg nucleus mediates which of the following functions:
- A. Associated movements
 - B. Postural reflexes and muscle tone
 - C. Swing phase of locomotion
 - D. Head movement in response to visual stimulus
 - E. Head movement in response to auditory stimulus

MATCHING ITEMS

In each of the following groups there are two numbered lists. Mark on the answer sheet in the line corresponding to each question number in the lower list (93-94) the letter of the related item of the upper list.

DIRECTION: Select the option (A-H below) which best fits the description numbered 93-94.

- A. Cuneocerebellar tract
- B. Dorsal spinocerebellar tract
- C. Juxtarestiform body
- D. Middle cerebellar peduncle
- E. Olivocerebellar fibers
- F. Pontocerebellar fibers
- G. Superior cerebellar peduncle
- H. Ventral spinocerebellar tract

- 93. It crosses the midline twice.
- 94. Its destruction results in nystagmus to the contralateral side of the lesion.

95. Which of the following is the INCORRECT statement with regard to the alterations in neurotransmitter system in aging?
- A. Decrease in catecholamine synthesizing enzymes
 - B. Decrease in acetylcholine metabolite reuptake
 - C. GABA/glycine systems are more affected than glutamate/aspartate systems
 - D. Decrease in receptor function but not necessarily receptor density and distribution
 - E. Decrease of catecholamine (dopamine, norepinephrine) levels through cell death
96. The primary olfactory cortex for perception of smell is located in which of the following areas?
- A. Prepiriform and periamygdaloid cortex
 - B. Entorhinal cortex
 - C. Lateral entorhinal cortex
 - D. Orbitofrontal cortex
 - E. Corticomедial amygdaloid nuclei
97. All of the following pertain to the fastigial nucleus EXCEPT:
- A. It receives projections from the ipsilateral vestibular nuclei
 - B. It is the most medial of the four deep cerebellar nuclei
 - C. It receives projections from the inferior olivary nucleus
 - D. It projects to the contralateral medial dorsal (MD) nucleus
 - E. It receives projections from portions of the anterior lobe of the cerebellum

98. Which of the following is the INCORRECT statement with regard to the pathophysiology of decerebrate rigidity following subdural hematoma?
- A. Herniation of the medial temporal lobe results in progressive compression of the brainstem.
 - B. Increased inhibition of the rostral facilitatory zone of the reticular core mediated by corticoreticular fibers
 - C. Decreased facilitation of the caudal inhibitory zone of the reticular core
 - D. Increased activity in the anterior reticulospinal tract to spinal extensor gamma motor neurons
 - E. Decreased activity in the lateral reticulospinal tract to spinal extensor gamma motor neurons
99. Which of the following is the CORRECT statement with regard to the taste pathway?
- A. Primary taste fibers in the glossopharyngeal nerve enter the brain stem at the level of the mid medulla
 - B. Secondary taste fibers originating in the nucleus solitarius for perception of taste ascend in the contralateral central tegmental tract
 - C. Secondary taste fibers terminate in the most lateral portion of the VPM thalamic nucleus
 - D. Tertiary taste fibers originating in the VPM terminate in the insular cortex and portions of the postcentral gyrus.
 - E. The caudal one half of the nucleus solitarius is considered the "taste" nucleus.
100. The representational hemisphere is superior to the categorical hemisphere at:
- A. Language function
 - B. Control of voluntary movement
 - C. Recognition of objects by their shape
 - D. Understanding the significance of printed words
 - E. Understanding mathematical functions