

MOTOR SYSTEMS

1. A lesion that destroyed all the fibers in the right medullary pyramid would be expected to cause
  - A. flaccid paralysis of all voluntary muscles on the left side of the body
  - B. spastic paralysis of all voluntary muscles on the left side of the body
  - C. flaccid paralysis of all voluntary muscles on the left side of the body below the head, but not including facial muscles
  - D. spastic paralysis of all voluntary muscles on the left side of the body below the head, but not including all facial muscles
  - E. spastic paralysis of all voluntary muscles on the left side of the body below the head, but bilateral spastic paralysis of facial muscles
  
2. Axons forming the corticospinal tract originate from neurons in which layer of the primary motor cortex (M1)?
  - A. layer 4
  - B. layer 5
  - C. layer 4 for axons innervating distal muscles in the extremities, layer 5 for axons innervating axial muscle in the trunk
  - D. layer 4 for axons innervating flexor muscles, layer 5 for axons innervating extensor muscles
  - E. none of the above, since axons from M1 do not contribute to the corticospinal tract
  
3. A person can execute simple voluntary movements involving muscles on either the right or left side of the body but has great difficulty executing complex bilateral movements. A lesion of which of the following structures could explain this deficiency?
  - A. primary motor cortex
  - B. corticospinal tract
  - C. supplementary motor cortex
  - D. putamen and caudate nuclei of the basal ganglia
  - E. superchiasmatic nucleus
  
4. Huntington's disease is characterized by which of the following?
  - A. an inherited disorder associated with degeneration of D2 dopamine receptor cells of the basal ganglia striatum
  - B. a degenerative disorder involving dopamine producing cells of the substantia nigra of the basal ganglia
  - C. ischemic necrosis of the vermis of the cerebellum due to a stroke
  - D. traumatic interruption of the rubrospinal or reticulospinal tracts of the brain stem and spinal cord
  - E. destruction of alpha motoneurons due to bacterial or viral infection

5. Inability to execute the finger-nose tracking demonstrated in class is characteristic of lesions of the
- A. vestibulo-cerebellum
  - B. cerebro-cerebellum
  - C. spino-cerebellum
  - D. supraoptic nucleus of the hypothalamus
  - E. mammillary body of the hypothalamus
6. All of the following are likely consequences of a lower motoneuron lesion except
- A. muscle paralysis or paresis
  - B. muscle atrophy
  - C. reduced muscle tone (hypotonia)
  - D. muscle fasciculations
  - E. reflex clonus
7. The Babinski sign is
- A. normal in adults but indicates lack of development of upper motoneurons in infants
  - B. normal in infants but indicates upper motoneuron lesion in adults
  - C. normal in infants but indicates lower motoneuron lesion in adults
  - D. a sign of degenerative of gamma (small) motoneurons in both infants and adults
  - E. characteristic of flaccid paralysis in both infants in adults

#### HYPOTHALMUS

8. Which of the following are characteristic of the body's response at the termination of a febrile episode (when the fever "breaks")?
- A. cutaneous vasoconstriction and shivering
  - B. cutaneous vasoconstriction and sweating
  - C. cutaneous vasodilation and shivering
  - D. cutaneous vasodilation and sweating
  - E. simultaneous sweating and shivering
9. The hormones released from the posterior pituitary gland (neurohypophysis) are synthesized in the
- A. posterior pituitary
  - B. anterior pituitary
  - C. hypothalamus
  - D. brainstem reticular formation
  - E. limbic system

## BRAIN ELECTRICAL ACTIVITY

10. Right now, as you are taking this examination, your electroencephalogram is probably characterized by
- A. large amplitude, low frequency slow wave
  - B. small amplitude, high frequency waves
  - C. seizure-like activity
  - D. flat EEG waves (no EEG waves) because you are paralyzed with anxiety
  - E. any of the above, depending on well you know the material
11. Synchronous activity of large areas of the cerebral cortex is seen in
- A. a relaxed state with eyes closed
  - B. working mathematics problems in your head
  - C. REM sleep
  - D. epileptic seizures
  - E. emotional embarrassment
12. REM (rapid eye movement) sleep is characterized by all of the following except
- A. unconscious movements, such as sleepwalking
  - B. dreaming
  - C. increased metabolic rate
  - D. increased heart rate
  - E. rapid, low amplitude EEG waves

## EMOTION, LIMBIC SYSTEM

13. Anxiety disorders, such as panic attacks, are associated with inappropriate activation of the
- A. prefrontal cerebral cortex
  - B. cingulate gyrus of the limbic system
  - C. amygdala
  - D. hippocampus
  - E. corpus callosum
14. Stimulation of the nucleus accumbens of the basal ganglia would be expected to produce
- A. hyperkinetic movements involving somatic muscles
  - B. hypokinetic movements involving somatic muscles
  - C. the emotional "fear" response
  - D. the emotional "reward" response
  - E. vivid recall of memories of past events

## MASTICATION

15. Normal mastication is characterized by all of the following except
- A. is unilateral (rather than on both sides of the mouth simultaneously)
  - B. involves both vertical and lateral jaw movement
  - C. rhythm is mediated by a central pattern generator in the brain stem
  - D. requires voluntary initiation
  - E. none of the above; that is, none are exceptions because all are characteristic of normal mastication
16. During the slow closing phase of mastication food reduction when chewing food on the right side of the mouth, which of the following muscles are active?
- A. right masseter
  - B. left masseter
  - C. right digastric
  - D. left digastric
  - E. both A and B above

## HIGHER FUNCTION, LANGUAGE

17. Wernicke's aphasia (fluent aphasia) is most likely to result from a stroke involving the
- A. left frontal lobe of the cerebral cortex
  - B. right frontal lobe
  - C. left temporal lobe
  - D. right temporal lobe
  - E. left parietal lobe
18. The non-dominant or representational hemisphere of the brain is associated with all of the following abilities except
- A. recognizing musical tunes
  - B. speaking in coherent sentences
  - C. face recognition
  - D. conscious emotions
  - E. ability of a dentist to perform a restorative procedure when using a dental mirror

## LEARNING AND MEMORY

19. Normal short-term declarative memory but lack of ability to consolidate short-term into long-term memory would likely be due to lesions of the
- A. brainstem ascending reticular formation (reticular activating system)
  - B. thalamic specific projection nuclei (e.g. VPL & VPM)
  - C. hippocampus of the limbic system
  - D. cerebro-cerebellum
  - E. any of the above

## ASSOCIATION CORTEX

20. Phineas Gage suffered a traumatic accident which causes lesions in the prefrontal association cortex (dorsolateral cortex and orbitofrontal cortex). Among the consequences we might have expected from this unfortunate event are
- A. inability to recognize faces
  - B. personality changes
  - C. left side neglect
  - D. loss of stereognosis (ability to identify an object from touch)
  - E. all of the above
21. The representational (non-dominant) parietal association cortex mediates
- A. awareness of the contralateral side of the body
  - B. awareness of the ipsilateral side of the body
  - C. planning and foresight
  - D. long-term memory
  - E. both A and B above

## EYE MOVEMENT CONTROL

22. Saccades are typical of eye movements when
- A. tracking moving objects
  - B. reading the questions in this examination
  - C. keeping the eye focused on a fixed point when rotating the head
  - D. adjusting the two eyes to focus on a nearby object and providing information about the distance of the object
  - E. all of the above, since saccades are involved in all normal eye movements
23. The immediate output from the horizontal and vertical gaze centers goes to the
- A. vestibular organs
  - B. superior colliculus
  - C. frontal eye fields of the cortex
  - D. extraocular muscle motoneurons (c.n. III, IV, VI)
  - E. directly to the six extraocular muscles