1. Which of the following statements about sensory systems is **true**:
   A. axons mediating touch cross the nervous system in the cervical spinal cord
   B. a lesion of the ventral white commissure damages pain fibers bilaterally
   C. touch information from the upper legs travels in fasciculus cuneatus
   D. first order neurons synapse onto second order neurons in the dorsal root ganglion
   E. the VPL of thalamus is involved in emotional aspects of pain

2. An early-stage, extramedullary tumor growing on the ventrolateral surface of the spinal cord that causes irritation of nerve fibers adjacent to it would most likely cause which of the following:
   A. tingling sensation on one side of the body
   B. pain in the shoulders on one side
   C. loss of position sense in the leg on one side
   D. pain in the back of the leg on one side
   E. suspended, bilateral loss of pain sensation in the lower body

3. The majority of the largest diameter nerve fibers in the dorsal roots synapse in:
   A. marginal zone of the spinal cord
   B. medial lemniscus
   C. intralaminar nuclei
   D. VPL
   E. nucleus cuneatus

4. A patient who has a lesion of cranial nerve VII on the right would demonstrate which response when the right cornea was touched with a cotton applicator:
   A. no eyes blink
   B. right eye blinks
   C. left eye blinks
   D. both eyes blink

5. At which of the following locations is the somatotopic orientation of the body for tactile information represented as upper body is lateral and lower body is medial:
   A. rostral pons
   B. caudal pons
   C. cervical region of spinal cord
   D. rostral medulla
   E. caudal midbrain

6. A patient that cannot localize the source of a pain stimulus but who can still feel the pain most likely has a lesion in:
   A. thalamus
   B. substantia gelatinosa
   C. cingulate gyrus
   D. medial lemniscus
   E. postcentral gyrus
7. The ability to identify an unseen, familiar object placed in the hand depends upon an intact:
   A. medial lemniscus
   B. spinothalamic tract
   C. VPM
   D. ventral trigeminothalamic tract
   E. both A and C

8. Loss of pain and temperature sensation from the level of the right little finger and the rest of
   the body below on the right side would most likely be caused by a lesion of the:
   A. left ALS at C6
   B. left ALS at T2
   C. right ALS at C6
   D. right ALS at C8
   E. anterior white commissure at C8

9. Which of the following statements about the trigeminal system is True:
   A. tactile sensation for the face is mediated by VPL but pain is mediated by VPM
   B. trigeminal pathways terminate on the posterior portion of the paracentral lobule
   C. regions at the back of the face are represented caudally in the spinal trigeminal nucleus
   D. trigeminal neuralgia is thought to be caused by a lesion in the ventral
      trigeminothalamic tract
   E. axons of second order neurons mediating pain are located in the spinal trigeminal tract

10. The pathway involved in reflex contraction of the lower jaw when the chin is tapped
     downward utilizes cell bodies of first order sensory neurons located in the:
     A. trigeminal ganglion
     B. spinal trigeminal nucleus
     C. mesencephalic nucleus of V
     D. dorsal root ganglion
     E. facial nucleus

1. B
2. D
3. E
4. C
5. C
6. E
7. A
8. A
9. C
10. C
On the diagram below, draw the pathway that mediates transmission of pain and temperature information for the face. You must indicate the locations and names of AXONS and CELL BODIES for each neuron in the pathway (3.5 pts)
VISUAL SYSTEM

1. Horner's syndrome would be caused by damage to which of the following structures:
   A. trigeminothalamic fibers
   B. ciliary ganglion
   C. cranial nerve III
   D. intermediolateral cell column
   E. optic radiations

2. Which of the following statements about the visual system is TRUE:
   A. the optic nerve is myelinated by schwann cells
   B. the sensitivity of the fovea is due to the convergence of cones
   C. an excess of aqueous humor results in papilledema
   D. the Loop of Meyer is located in the parietal lobe
   E. information from the upper retina terminates in the cuneus

3. On examining a patient you obtain the following findings: Shining a light into the right eye produces no effect, but shining a light into the left eye causes both the left and right pupils to constrict. This result could be caused by a lesion of:
   A. right optic tract
   B. right optic nerve
   C. right cranial nerve III
   D. left cranial nerve III
   E. right pretectal area

4. Which of the following eye movements is used in the Accommodation reflex:
   A. saccade
   B. smooth pursuit
   C. nystagmus
   D. vergence
   E. tracking movement

5. Which of the following statements about the visual system is true?
   A. Rods hyperpolarize in response to light but depolarize in response to dark.
   B. Rods are found at all locations in the retina but cones are found only in the macula.
   C. Retinitis pigmentosa begins with degeneration of ganglion cells in the peripheral part of the retina.
   D. In the dark, sodium and potassium ions enter the rod outer segment through rhodopsin channels.
6. Choose the best answer regarding the visual system.
   A. Neurons in the lateral geniculate nucleus have receptive fields that respond to bars, edges, and direction of movement.
   B. Some cells in the visual cortex respond well to a vertical black line and a horizontal white line.
   C. Most visual centers in the temporal lobe contain neurons that are sensitive to moving stimuli.
   D. Visual areas in the parietal lobe are important for facial recognition
   E. None of the above are true.

7. Choose the best answer about the development of the visual system:
   A. If a baby is born with a drooping eyelid that completely obstructs vision in one eye, connections in the visual cortex may not develop correctly.
   B. Connections in the visual system begin to sort into ocular dominance zones at 6 months after birth.
   C. During the normal development of the visual cortex, ocular dominance columns form in which all the cells respond to the same orientation of visual stimulus.
   D. If a child is born with a cataract in the left eye and that cataract is not removed until one year of age, only 20% of the cells in the lateral geniculate will be able to respond to left eye input.
   E. Both A and B are true

8. Choose the best answer about the development of the visual system:
   A. Selective cell death in the lateral geniculate is the primary mechanism underlying the transition of layer 4 cortical cells from binocular to monocular.
   B. During normal development, cells in layer 4 of the visual cortex initially have input from both the left-eye and right-eye layers of the lateral geniculate.
   C. The critical period for formation of normal binocular connections in the visual cortex lasts for about 2 months in a newborn baby but lasts about 2 years in a person who develops a cataract as an adult.
   D. NMDA-type glutamate receptors are likely to participate in the development of binocular connections in the cortex because they have a high potassium permeability.
   E. None of the above are true.

1. D
2. E
3. B
4. D
5. A
6. E
7. A
8. B
22-25. The diagram on the right shows the **VISUAL FIELDS** for the left and right eyes. 1) Shade in the appropriate areas of the visual fields in the right column that correspond to a lesion in the location named in the left column. 2) In the space provided in the left column indicate the name of the visual deficit. **Be sure to indicate the side of the lesion in the name and diagram.** (2 points ea)

22. Location: **RIGHT Optic Nerve**
   
   Name: __________________________________________

23. Location: **LEFT Lateral Geniculate Nucleus**
   
   Name: __________________________________________

24. Location: **RIGHT Cuneus**
   
   Name: __________________________________________

25. Location: **LEFT Optic Tract**
   
   Name: __________________________________________