HBA 531 - THE BODY
Head & Neck Written Examination - November 4, 2013

Name: ______________________________________________

NOTE 1: Whenever your answer refers to a cranial nerve, give both its number and its name. In the case of the trigeminal nerve, give also its division.

NOTE 2: When asked to trace nerve, artery, or vein pathways, do so by using arrows, e.g., structure a --> structure b --> structure c --> . . . --> destination. If pathways branch, indicate by branching arrows.

1. What is the anterior fontanelle and where is it located? (4)

Identify three things about which you hope to learn when palpating the anterior fontanelle of an infant. Explain how what you feel relates to what you hope to learn.

a) 

b) 

c) 

2. What anatomical features distinguish a subdural hematoma from an epidural hematoma in regard to the following: (3)

a) Where blood accumulates

b) Source of blood

c) Speed of accumulation of blood

3. Explain how the anatomy of the neonate makes it malpractice to place a forceps behind the ear to promote its delivery? (1)

4. Where is aqueous humor produced? (be specific) (1.5)

Identify all the places it goes from here, including how it is removed.
5. Trace the pathway of innervation of the ciliary muscle beginning at the brainstem. (2)

What happens when the ciliary muscle contracts?

Under what circumstances is contraction of the ciliary muscle usually needed?

6. A man visits an ophthalmologist complaining about his vision. After examining him, the ophthalmologist determines his visual field is limited to the shaded areas depicted in the figure. (2)

What is his condition called? ____________________________

Label the diagram where indicated, and draw in the path of the sensory axons from each hemiretina.

Place a line through the structure that has most likely been injured.

7. In older people the footplate of the stapes may become fixed to the bone surrounding the oval window. This condition is called otosclerosis. It produces a significant hearing loss. So would a tumor of CN VIII. Name and describe the most reliable test you could use that might distinguish between a hearing loss due to otosclerosis and one due to a tumor of CN VIII. State the result of this test in the case of otosclerosis.

8. You are visited by a patient who tilts her head (laterally flexes her neck) to her right when talking to you. When you ask her why, she replies that if she holds her head straight up, she sees double. What is the most likely cause of this phenomenon? (1)

If you instruct her hold her head straight up, what difference in her eyes might you observe?
9. List the muscles known collectively as the infrahyoid muscles and describe the pattern of their motor innervation. (2)

10. On the picture shown on the right, indicate (and label) the best site to test for sensory function served by each of the different divisions of the trigeminal nerve and by C2. (2)

11. Trace lymph from the palatine tonsil to the blood stream. Name all relevant nodes. (1.5)

12. What are emissary veins, and what is their clinical significance? (1)

13. If you occlude the inner division of the right maxillary artery in order to stop nosebleeds that have not responded to intranasal packing, what additional arterial supply to the right nasal cavity might cause failure of this procedure to accomplish your goal? (0.5)

14. What anatomical structure is injured during a whiplash (hyperextension) injury of the neck and why is pain relieved by use of a collar that is higher in the back than in the front? (1)

15. In the normal course of performing a carotid endarterectomy, you clamp the left common carotid 2 cm inferior to its bifurcation. Next you make a linear incision through the walls of the common and internal carotid arteries superior to the site of the clamp. You are pleased to observe considerable backflow of blood spilling into your field from the left internal carotid that you have just opened up. Starting at the heart, trace a route of blood flow that can account for this observation. (2)

heart -->

--> I. internal carotid a.
16. The following are symptoms of nerve damage. In each case, name the cranial nerve (left or right side) that has most likely been damaged. (For the trigeminal nerve, indicate which division is involved.) (2.5)

a) You ask the patient to shrug her shoulders, and you can easily push the right one down
b) Your patient has lost the ability to voluntarily blink on the right side
c) You ask the patient to stick out her tongue, but it deviates toward the left side of her face when she does so
d) You shine a bright light in the patient’s right eye, but neither pupil contracts
e) You ask the patient to say “Ahh” and his uvula shifts toward the left when he does so

17. How is the “danger space” of the neck defined anatomically? (1)

Why is it called a “danger space”?

18. Trace arterial blood supply from the heart to the indicated structures. (4.5)

a) heart-->

---> left lower lip.

b) heart -->

---> left retina

c) heart -->

---> left inferior parathyroid gland

19. How would unilateral damage to the recurrent laryngeal nerve affect: (1.5)
   a) speaking
   b) breathing
   c) coughing
20. There are a number of openings in the skull for the passage of nerves and/or vessels. Name the opening by which each of the following either exits or enters the cranial cavity: (5)
   a) Ophthalmic division of the trigeminal nerve______________________________
   b) Maxillary division of the trigeminal nerve______________________________
   c) Mandibular division of the trigeminal nerve______________________________
   d) Optic nerve________________________________________________________
   e) Glossopharyngeal nerve____________________________________________
   f) Hypoglossal nerve___________________________________________________
   g) Middle meningeal artery____________________________________________
   h) Vertebral artery____________________________________________________
   i) Facial nerve________________________________________________________
   j) Abducens nerve_____________________________________________________

21. A patient complains her teeth don’t seem to fit together properly anymore. Without touching her, what could you ask her to do that might reveal if she has damage to V3? (3)

   Provide an anatomical explanation for how this test could reveal the side of the damage.

   If the result of the test was equivocal, what motor test could you perform (touching permitted) that would allow a more accurate assessment of unilateral damage to V3?

22. Identify the type of neurons whose cell bodies are located in the following ganglia: (3.5)
   a) geniculate__________________________________________________________
   b) submandibular_____________________________________________________
   c) trigeminal________________________________________________________
   d) ciliary____________________________________________________________
   e) pterygopalatine___________________________________________________
   f) otic______________________________________________________________
   g) stellate___________________________________________________________
23. Explain how infections spread from the throat to the middle ear, and why this happens more commonly in children. (1)

24. The most common form of simple craniosynostosis is scaphocephaly. What structure does not develop correctly? Where does compensatory growth occur?

Briefly describe the resulting shape of the braincase. (1.5)

25. For years MM would blush intensely at the slightest provocation and she came to dread social situations. What surgical procedure might she elect to undergo to dramatically reduce her blushing? What side effect of this procedure might she notice particularly on a warm summer day?

26. Identify the structures with the following relationships:

a) passes anterior to the tympanic cavity within the petrous temporal
b) passing anteriorly within the roof of the maxillary air sinus
c) divides into an upper and lower division within the substance of the parotid gland
d) crosses the lower border of the mandible at the anterior edge of the masseter

a) heavy exertion
b) speech
c) quiet respiration
d) coughing
e) intermediate (cadaveric)
27. Briefly state the function of each of the following structures: (1.5)
   a) arachnoid villi
   b) neurocranial synchondroses
   c) parotid gland

28. Below are pictures of a man whose visual fields are being tested by asking him to raise his hand when he sees the head of a pin (sometimes shown here as a white dot, others times as a black dot). What is the name of his condition and where does the lesion lie? (1)

29. The images below are of two different patients (a) and (b), with similar, but not identical symptoms. In each case identify the nerve(s) that has(have) been injured. Be sure to state the side of injury. Then give at least two reasons for each of your answers.

   (a) injured nerve(s) ______________________________________________________________
   reasons:

   (b) injured nerve(s) ______________________________________________________________
   reasons:
30. Below are four T1-weighted axial MRIs. On the top is a midsagittal image with dashed lines indicating the levels of the three axial images labeled a, b, and c. To the right are a series of statements. Enter into the blank after each statement the letters and/or numbers of all structures that satisfy it. Partial credit will be given for partially correct answers; partial credit will be subtracted for incorrect answers. (9.5)

If no letter or number satisfies the statement, draw a line drawn through the following blank.

A letter or number may be used in more than one blank.

It is not the case that every letter or number must be used.

“innervated by X” means that “X” carries sensory, somatic motor, or preganglionic autonomic axons for the structure whose letter you enter

innervated by C.N. I ____________________________
innervated by C.N. II ____________________________
innervated by C.N. III ____________________________
innervated by C.N. IV ____________________________
innervated by C.N. V ____________________________
innervated by C.N. VI ____________________________
innervated by C.N. VII ____________________________
innervated by C.N. VIII ____________________________
innervated by C.N. IX ____________________________
innervated by C.N. X ____________________________
innervated by C.N. XI ____________________________
innervated by C.N. XII ____________________________
innervated cervical ventral rami ____________________________
innervated cervical dorsal rami ____________________________
carries arterial blood that entered the common carotid artery at its origin ____________________________
carries venous blood that entered the internal jugular vein at its origin ____________________________