1. One end of the auditory (eustachian) tube opens into the
   A.) cochlear duct  
   B.) middle ear  
   C.) outer ear  
   D.) saccule

2. This is the
   A.) left labyrinth, seen from above.  
   B.) lateral surface of the left labyrinth.  
   C.) right labyrinth, seen from above.  
   D.) lateral surface of the right labyrinth.

3. Perilymph
   A.) fills the utricle.  
   B.) bathes the "hairs" of cochlear hair cells.  
   C.) has a sodium concentration much lower than that of cerebrospinal fluid.  
   D.) flows through the helicotrema.
4. A patient complained of trouble hearing with her left ear. You find that if you hold a vibrating tuning fork by her left ear until she can no longer hear it, she cannot hear it again if you press it against her left mastoid process, but she can hear it if you move it to her right ear or press it against her right mastoid process. The most likely cause of her hearing problem is

A.) bony growths that impede vibrations of the left middle ear bones.
B.) a left-sided middle ear infection.
C.) noise-induced loss of hair cells from the left cochlea.
D.) damage to the left inferior colliculus.
E.) damage to the right inferior colliculus.

5. The gelatinous material most important for coupling sound vibrations to cochlear hair cells is located in the

A.) basilar membrane.
B.) crista.
C.) cupula.
D.) otolithic membrane.
E.) tectorial membrane.

6. Unilateral deafness would be caused by loss of the neurons in the _____ on one side.

A.) cochlear nuclei
B.) inferior colliculus
C.) superior olivary nucleus
D.) any of the above
E.) either (a) or (b)
F.) either (a) or (c)

7. Starting from a normal head-upright position, acceleration in a(n) _____ direction would effectively stimulate hair cells in BOTH the utricle and the saccule.

A.) anterior-posterior
B.) side-to-side
C.) up-down
D.) any of the above
E.) either (a) or (b)
F.) either (a) or (c)
8. Todd was trying to learn how to do the caloric nystagmus test, but he got mixed up and had the patient lying in a prone position (i.e., face down), so he couldn’t see any eye movements. Fortunately, some electrodes had been applied and the eye movements were recorded electrically. What would be the expected pattern of eye movements in such an individual, if Todd squirted WARM water into the left ear?

A.) Fast movement of both eyes to the left, followed by slow return to midposition over about 5 seconds.
B.) Fast movement of both eyes to the left, followed by slow return to midposition over about 5 seconds.
C.) Nystagmus that starts out with its fast phase to the left, then slowly fades away.
**D.) Nystagmus that starts out with its fast phase to the right, then slowly fades away.**
E.) Nystagmus that starts out with its fast phase to the left, followed by a period of nystagmus with its fast phase to the right.
F.) Nystagmus that starts out with its fast phase to the right, followed by a period of nystagmus with its fast phase to the left.

9. What kind of cells are located here?

A.) primary afferents (auditory)
B.) primary afferents (vestibular)
C.) 2nd-order sensory (auditory)
D.) 2nd-order sensory (vestibular)
10. Most of these fibers originate from the

A.) cochlear nuclei
B.) inferior colliculus
C.) medial geniculate nucleus
D.) superior olivary nucleus