

ID# _____
(You must use your Skidmore ID#)

Exam 2

PS 325, Fall 2004

As always, the Skidmore Honor Code is in effect and you'll write a statement to that effect at the end of the exam. The structure of this exam is much like that of the first exam. Read each question carefully and answer it completely. Multiple-choice questions are worth one point apiece. Have a wonderful winter break! Enjoy your time with family and friends.

Essay 1. Describe classical threshold theory, and the three classical methods described by Fechner. What is the concept of the jnd, and how did Fechner use that concept to derive his law? [20 pts]

Essay 2. "Two ears are better than one." Explain how we use the information in our auditory system to localize sounds. Why do we find it difficult to localize pure tones with frequencies (1000-5000 Hz) where pitch perception is quite good? [20 pts]

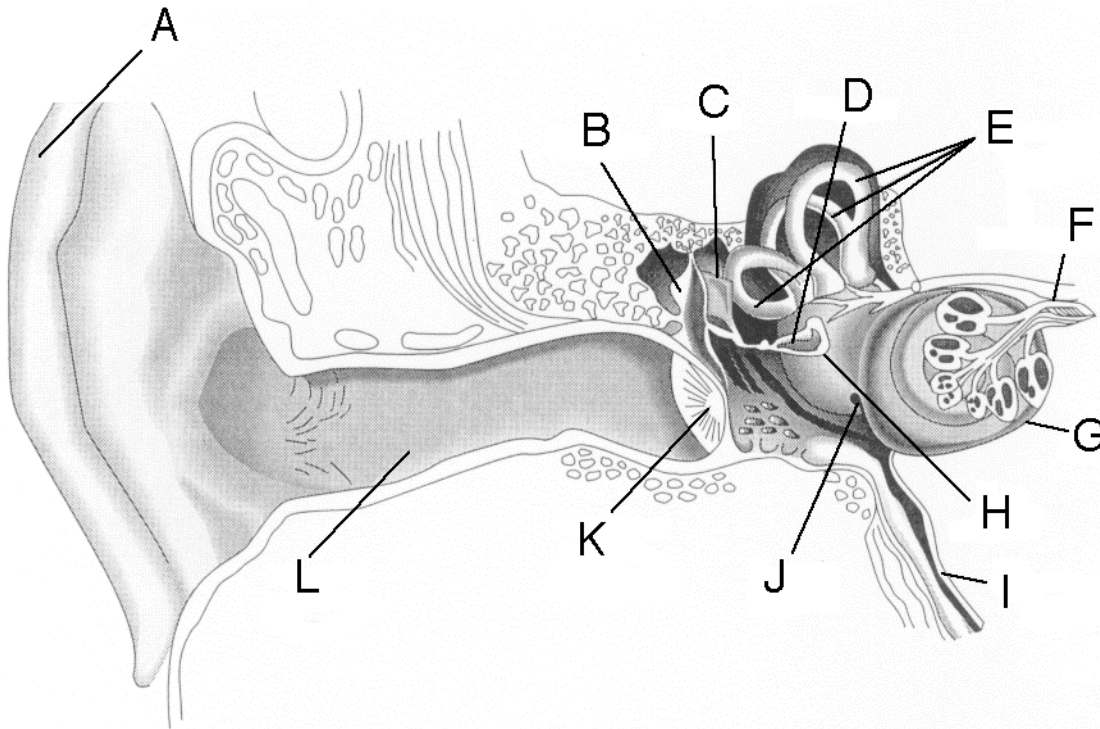
1. The two phonemes /b/ and /p/ differ from each other in
 - a. place of articulation.
 - b. manner of articulation.
 - c. dynamics.
 - d. voicing.

2. _____ is the smallest amount of energy required for the stimulus to be reported 50% of the time.
 - a. The ascending method of limits
 - b. The absolute threshold
 - c. The adaptation level
 - d. The criterion

3. In signal detection theory, one factor that influences sensitivity (d') is
 - a. how much the observer is paid for the task.
 - b. how much the observer is paid for correct responses.
 - c. the likelihood that the signal is being presented.
 - d. the intensity of the stimulus.

4. Suppose two sound waves identical in frequency and amplitude are in phase. When played together, they would produce
 - a. no sound — they would in effect cancel each other out.
 - b. a barely audible sound.
 - c. a loud rich sound.
 - d. a sound higher in frequency than either of the two waves alone.

5. If the eardrum were to lose its flexibility or be punctured,
 - a. the air pressure disturbances that it once encoded would now be encoded by the pinnae.
 - b. the ability to hear would be unaffected.
 - c. hearing would be greatly impaired because the eardrum could no longer vibrate to the pressure of sound waves.
 - d. only the pitch of incoming sounds would be affected.

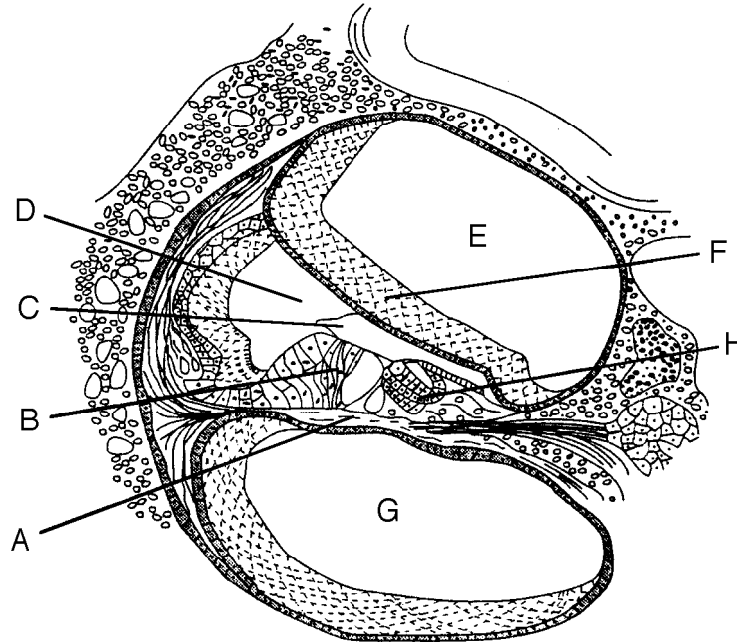


6. Match the labels from the figure above to each of the following parts of the auditory system: [10 pts]

Anatomical Part	Letter Label	Anatomical Part	Letter Label
Pinna		Eardrum	
Round Window		Stapes (Stirrup)	
Malleus (Hammer)		Eustachian Tube	
Contains Organ of Corti		Cochlea	
Incus (Anvil)		External Auditory Canal	
Auditory Nerve		Oval Window	

7. Match the labels from the figure above to each of the following descriptions: [6 pts]

Function	Letter Label
Amplifies some frequencies through resonance	
Membrane that pushes in on fluids in the vestibular canal	
Important for localization	
Important for equalizing air pressure in the auditory system	
Important for balance	
Contains perilymph and endolymph	
Site for transduction of sound stimuli	



8. Use the figure above to label the parts of the inner ear shown below: [4 pts]

Anatomical Part	Letter Label	Anatomical Part	Letter Label
Tympanic Canal		Cochlear Duct	
Vestibular Canal		Tectorial Membrane	
Reissner's Membrane		Outer Hair Cells	
Inner Hair Cells		Basilar Membrane	

9. Loss of efferent fibers would result in
- the inability of the brain to send messages to the hair cells.
 - the inability of the hair cells to send messages to the brain.
 - reduced sensitivity to certain frequencies.
 - conduction deafness.
10. Otosclerosis affects hearing by
- immobilizing the stapes, making conduction of sound stimulus difficult.
 - swelling the eustachian tube and cutting off the middle ear from the respiratory tract.
 - damaging the hair cells.
 - reducing the hair cells' motility.
11. The major problem(s) with Helmholtz's version of place theory was
- the width of the basilar membrane increases from the area near the stapes toward the area near the helicotrema
 - the basilar membrane is not under tension
 - it could not account for the refractory period
 - both a & b

12. You think that the chef added salt to the chocolate sauce on your dessert, and in fact the sauce does contain salt. In signal detection terms, you made a
- hit.
 - correct rejection.
 - false alarm.
 - miss.
13. A person with a high sensitivity and a high criterion in a signal detection study
- will be less likely to have a high false alarm than a person with a high sensitivity and a low criterion.
 - will be more likely to have a high false alarm than a person with a high sensitivity and a low criterion.
 - will make more hits than a person with a high sensitivity and a low criterion.
 - will make more false alarms than a person with low sensitivity and a low criterion.
14. An important conclusion from Weber's law is that
- the just noticeable difference is always a constant.
 - when we start with an intense stimulus, we must make a large change in that stimulus in order for a change to be noticed.
 - Weber's fraction is the same for all sensory systems.
 - a one-to-one correspondence exists between physical stimuli and psychological reactions.
15. Suppose that you are told that you will be participating in a magnitude estimation study of loudness. It is likely that you will be asked to
- listen to a series of sounds decreasing in loudness and indicate when you no longer hear the sounds.
 - say "I detect it" or "I do not detect it" for sounds that are either present or absent.
 - adjust a sound until its estimated magnitude is substantially larger than that of a standard loudness.
 - assign a number to indicate how loud a stimulus appears to be.
16. After composing a piece of music, the artist decides to change the flute solo to a cello solo — she thinks the flute passage sounds too airy and pure, and she knows that the cello solo will sound richer and more robust. She's right, but why?
- Tones produced by the cello are lower in frequency than those produced by the flute.
 - Tones produced by the cello are higher in amplitude than those produced by the flute.
 - Tones produced by the cello have more harmonics or overtones than those produced by the flute.
 - Tones produced by the cello have a higher pitch than those produced by the flute.
17. The phone rings, you pick it up, and are unsure who the person on the other end of the line is. Of the following characteristics, which would be the *most* useful clue to help you identify this particular individual?
- pitch
 - loudness
 - timbre
 - frequency
18. It was necessary to add the volley principle to frequency theory in order to explain how frequency is registered, because the frequency theory
- could not explain how we perceive very low notes.
 - could not explain how we perceive tones with frequencies of many thousand cycles per second.
 - could not explain how the middle ear transmitted sound to the inner ear.
 - could not explain how the ear registers complex tones.

19. In a signal detection study, suppose that we change the probability of the stimulus. As a result, we can also change
- the observer's criterion.
 - the observer's sensitivity.
 - the observer's threshold.
 - the observer's d' .
20. An octave represents
- the squaring of the frequency
 - the doubling of the frequency
 - an 1000 Hz gap between two notes
 - a 2000 Hz gap between two notes
21. What do equal loudness contours (Fletcher-Munson curves) express?
- The relationship between pitch and amplitude.
 - The relationship between loudness and amplitude.
 - The relationship between frequency and pitch.
 - The relationship between frequency and loudness.
22. Which structure is thought to be crucial in sound localization?
- the superior olivary nucleus
 - the eardrum
 - the lateral geniculate nucleus
 - Area 17 of the cerebral cortex
23. What happens when we combine two tones that are very similar in frequency?
- We hear beats or an unpleasant roughness, depending upon the difference in frequency of the two notes.
 - We hear a note that is halfway between the two notes.
 - We hear two distinctly different notes.
 - We hear a note that is equivalent to the sum of the frequencies of the two component notes.
24. Auditory fatigue can lead to
- a temporary threshold shift
 - a permanent threshold shift
 - both a & b
 - neither a nor b
25. Which of the following cues is the least helpful for segregating simultaneous streams of complex sounds?
- pitch
 - timbre
 - loudness
 - spatial location