

As always, the Skidmore Honor Code is in effect. At the end of the exam, I'll have you write and sign something to attest to that fact. The exam should contain no surprises, in that it's just like the first exam. Thanks for the contributions you made to the class throughout the semester. I really enjoyed myself. Have a pleasant and relaxing break. May the spirit of the season fill your heart.

Peace!

Essay 1. [20 pts] Is speech special? Describe the General Mechanism and the Special Mechanism accounts of speech perception. Be sure to provide examples of the evidence that supports each mechanism. What evidence do you find more compelling? Why?

Essay 2. [20 pts] Most owls are nocturnal predators who are better able to localize sounds in the environment than humans. Other animals (e.g., bats, dolphins) localize both sounds in the environment and sounds they emit (echolocation). Describe the research on these fascinating animals, including the mechanisms responsible, and the adaptation of their prey.

1. 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?

- a. Tones produced by the cello are lower in frequency than those produced by the flute.
- b. Tones produced by the cello are higher in amplitude than those produced by the flute.
- c. Tones produced by the cello have more harmonics or overtones than those produced by the flute.
- d. Tones produced by the cello have a higher pitch than those produced by the flute.

2. Inner hair cells, the actual receptors for hearing, are located in the

- a. helicotrema.
- b. oval window.
- c. round window.
- d. none of the above.

3. If a person were missing the organ of Corti in both ears, what would this person's auditory perception be?

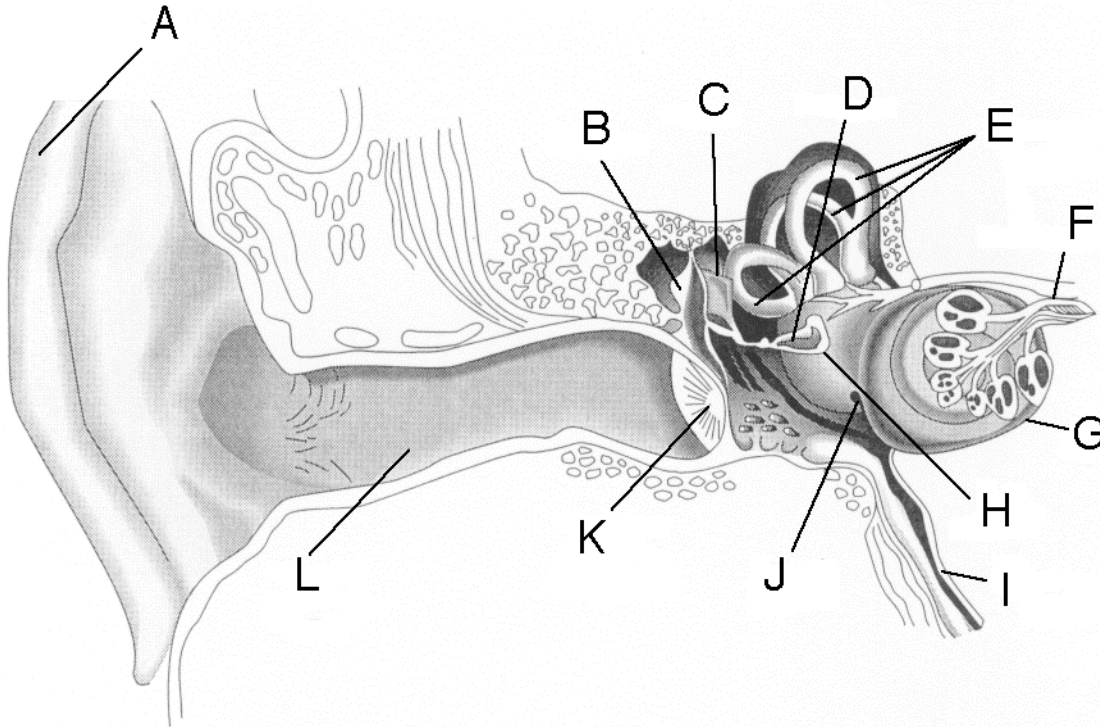
- a. Only high-frequency tones could be heard.
- b. Only low-frequency tones could be heard.
- c. Nothing could be heard.
- d. As long as the auditory nerve was intact, hearing would be normal.

4. In the auditory system, loss of efferent fibers would likely result in

- a. the inability of the brain to send messages to the inner hair cells.
- b. the inability of the outer hair cells to send messages to the brain.
- c. reduced sensitivity to certain frequencies.
- d. conduction deafness.

5. The term *just noticeable difference*

- a. is important in signal detection theory.
- b. refers to the value of the physical stimulus that is just barely detectable.
- c. refers to the psychological sensation that corresponds to a change in the physical stimulus that can barely be detected.
- d. is the same as the point of subjective equality.



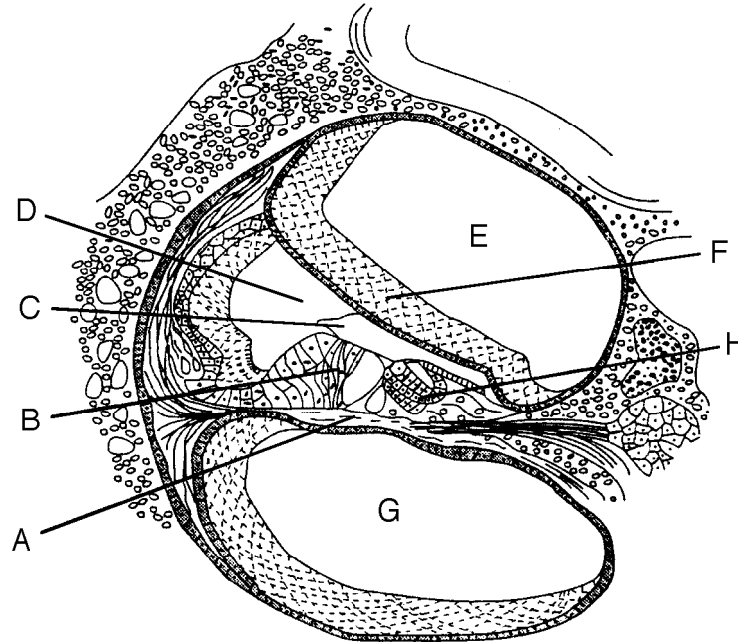
6. Match the labels from the figure above to each of the following parts of the auditory system: [10 pts]

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. If you were to use the method of constant stimuli for measuring discrimination of auditory stimuli,
- you would present comparison tones that were substantially lower than the standard stimulus.
  - you would have to use both ascending and descending series.
  - you would notice the frequency of the comparison stimulus at which the judgments changed from “higher than” to “same as.”
  - you would present comparison stimuli in random order and ask observers to compare these stimuli with the standard stimulus.
9. Weber’s law
- is not as reliable as Fechner’s law.
  - applies to a wider range of stimuli than Stevens’ power law.
  - works better in the middle range of stimuli than it does at the extremes.
  - has often been combined with signal detection theory.
10. Relative to a sound source located close to you, for a sound source located far away from your head, the onset difference
- decreases.
  - increases.
  - remains the same.
  - either increases or remains the same, depending on the frequency of the sound.
11. 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.
12. Your textbook showed a figure with one probability distribution representing “Noise” and one representing “Signal + noise.” In this kind of figure, a very sensitive observer would be represented by
- two completely overlapping probability distributions.
  - a criterion line at the extreme right of the figure.
  - two probability distributions that overlap very little.
  - a criterion line at the extreme left of the figure.
13. Which of the following factors does *not* facilitate speech perception?
- Visual access to the speaker’s lip movements.
  - The context of a phrase or a sentence.
  - Knowledge of the topic of conversation.
  - Previous exposure to the voice.
14. Suppose that a researcher records electrical impulses from a fiber in the auditory nerve and plots a frequency tuning curve. This figure is likely to show
- the fiber is most sensitive to a stimulus of a specific frequency, with lower sensitivity to more remote frequencies.
  - the fiber is equally sensitive to all frequencies.
  - the fiber vibrates at the same rate as the auditory stimulus.
  - all fibers in the auditory nerve are similar to each other in their frequency tuning curves.



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

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

17. Duplex perception

- provides support for the special mechanism account.
- involves presenting a phoneme to people and varying its voice onset time.
- is a phenomenon in which the same auditory stimulus is reported as having both speech and non-speech qualities.
- clearly illustrates the effects of top-down processing on speech perception.

18. In signal detection theory, one factor that influences sensitivity ( $d'$ ) is

- how much the observer is paid for the task.
- how much the observer is paid for correct responses.
- the likelihood that the signal is being presented.
- the intensity of the stimulus.

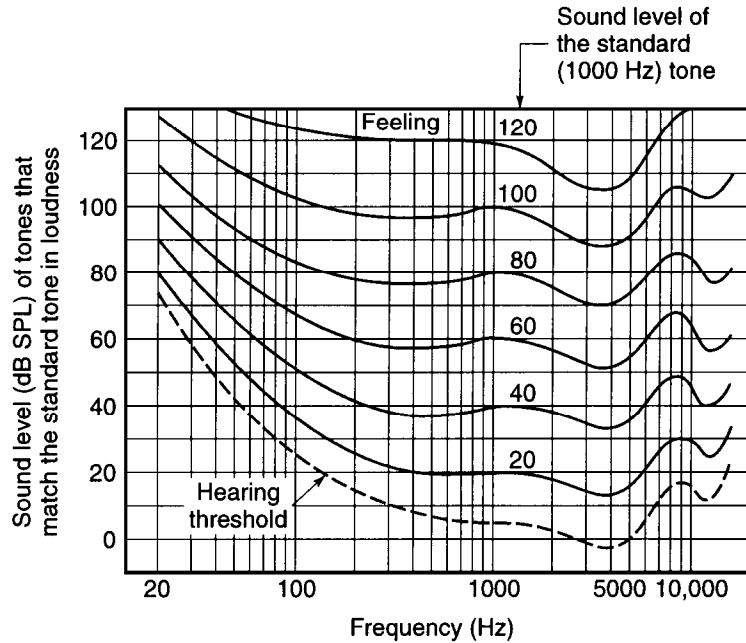
19. What part of the auditory system allows for comparisons of both auditory and visual spatial information?

- superior colliculus
- inferior colliculus
- superior olivary nucleus
- medial geniculate nucleus

20. 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

21. 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.



22. Based on the Fletcher-Munson curves above, circle the tone of the pairs below that would be louder (3 pts):

Pair 1	1000 Hz @ 30 dB	40 Hz @ 80 dB
Pair 2	20 Hz @ 50 dB	1000 Hz @ 10 dB
Pair 3	90 Hz @ 30 dB	5000 Hz @ 10 dB