

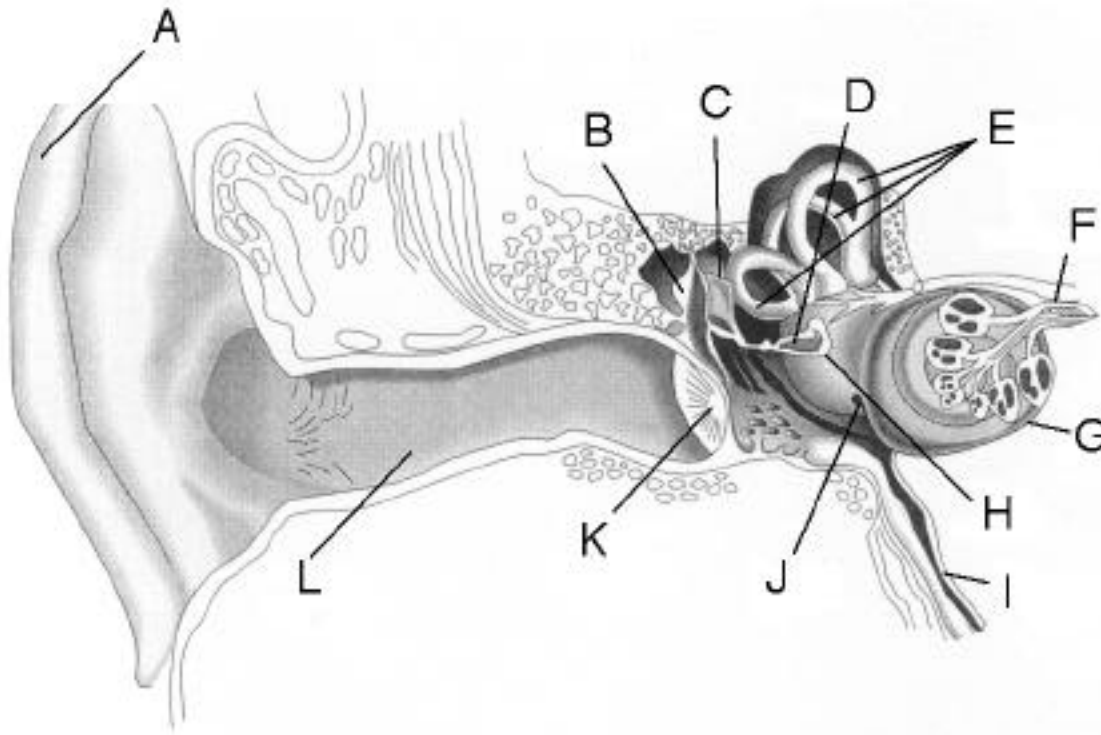
As always, keep your eyes foveated on your own exam. Because the exam is the same basic length as the first exam, you should have plenty of time to complete the exam. Point values are as indicated, with multiple-choice questions worth 1 pt each. Answer the essay questions on the lined paper. Have a great holiday. I look forward to seeing you next semester.

Essay 1. Describe the timing (frequency) and the place theories of pitch perception and include supporting and negative evidence for both theories. [20 pts]

Essay 2. Context has been shown to play an important role in visual perception. You've also learned of several instances in which context plays an important role in auditory perception. Discuss several such examples. [20 pts]

1. Complex tones
 - a. represent the combination of different pure tones.
 - b. are much more common than pure tones in nature.
 - c. can be decomposed into sine waves with Fourier analysis.
 - d. All of the above.
2. Imagine that you are a participant in a psychophysics experiment, and you are supplying judgments in a descending series for the method of limits. You have just said "Yes, I see it" on the last four trials, and you reply "Yes, I see it" for the fifth trial because you figure that the stimulus is not likely to change much. What kind of error are you making?
 - a. Error of anticipation
 - b. Criterion error
 - c. Error of habituation
 - d. Error of adaptation
3. According to Békésy's research on place theory, why does the traveling wave die out more rapidly near the stapes?
 - a. Because the basilar membrane is stiffer near the stapes than near the helicotrema.
 - b. Because the basilar membrane is more relaxed near the stapes than near the helicotrema.
 - c. Because a wave that travels as far as the stapes is unable to gather strength from external stimuli.
 - d. None of the above.
4. In the octave illusion, a listener hears
 - a. high tones in one ear and low tones in the other ear.
 - b. high tones transposed an octave higher.
 - c. low tones transposed an octave lower.
 - d. two tones one octave apart, even though only a single tone was presented.
5. The tritone paradox results from
 - a. misperception of tone heights.
 - b. misperception of tone chroma.
 - c. misperception of the figure-ground relationship.
 - d. transposition.

6. According to current theorizing, how is amplitude registered by the auditory system?
- The greater the amplitude of the incoming wave, the more vigorously the neurons all along the basilar membrane will fire.
 - High amplitude waves maximally stimulate the basilar membrane at one end while low amplitude waves maximally stimulate the opposite end.
 - The basilar membrane will vibrate at the same amplitude as the incoming wave.
 - The greater the amplitude of the incoming wave, the greater the number of outer hair cells that will be stimulated.



7. Match the labels from the figure above to each of the following parts of the auditory system: [4 pts]

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

8. Match the labels from the figure above to each of the following descriptions: [2 pts]

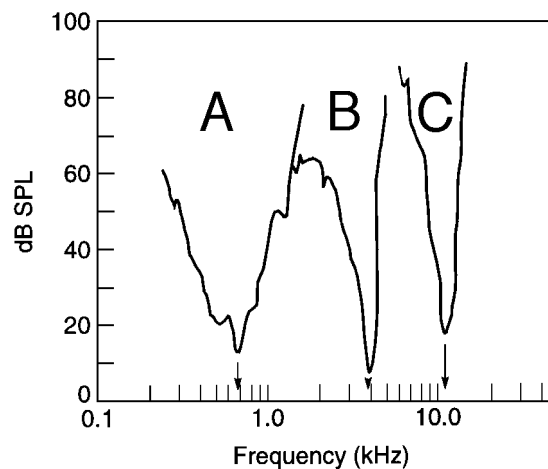
_____	Important for localization
_____	Amplifies some frequencies through resonance
_____	Important for equalizing air pressure in the auditory system
_____	Membrane that pushes in on fluids in the vestibular canal
_____	Membrane at the end of the tympanic canal

9. A receiver operating characteristic (ROC) curve shows
- the relationship between d' and criterion.
 - the relationship between sensitivity and false alarm rate.
 - the number of correct rejections a typical observer might make.
 - the relationship between the probability of a hit and a false alarm.
10. 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.
11. 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.
12. 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

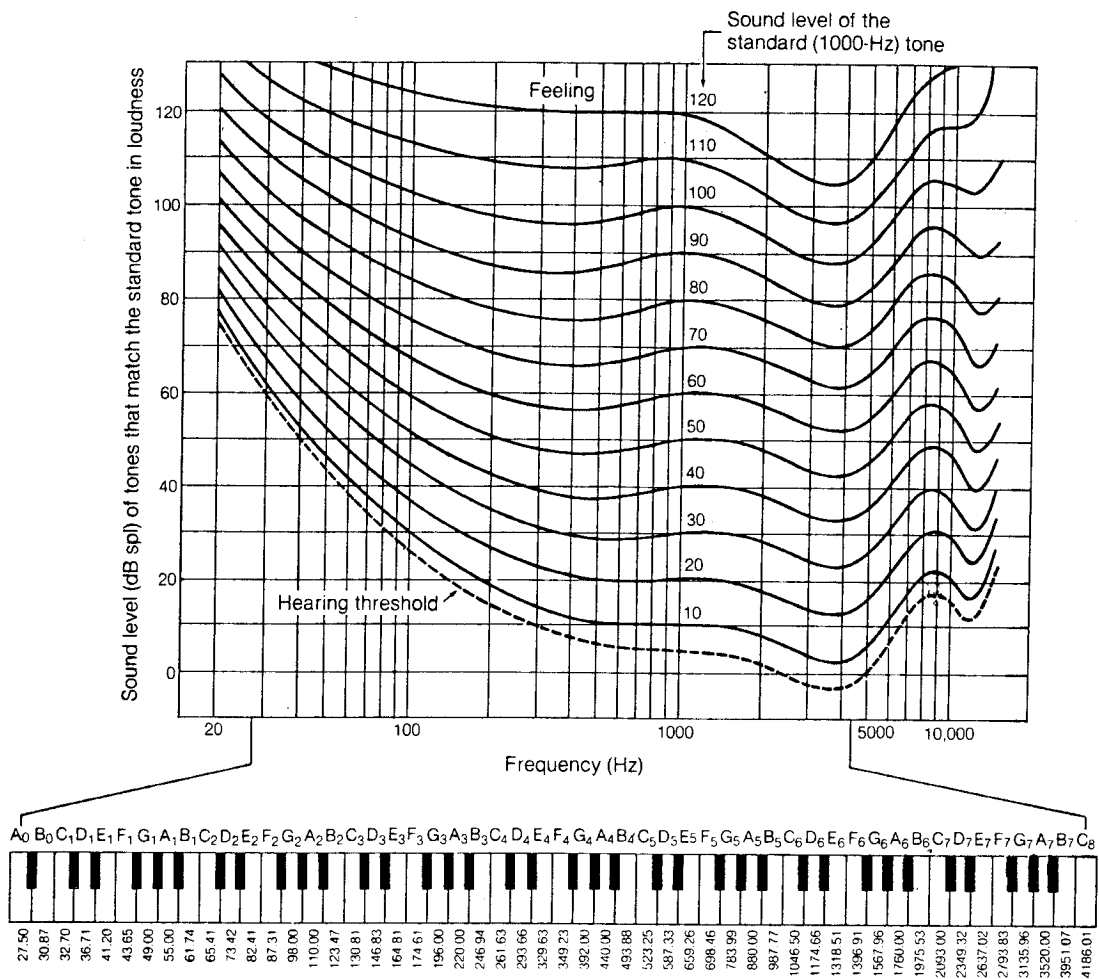
13. Why do we find it difficult to localize pure tones with frequencies around 1000 Hz? [4 pts]

14. In the video on music, what seemed to be the essential components to playing in a musical fashion (or, what seemed to lead to "unmusical" playing)? [3 pts]

15. Briefly describe the method of constant stimuli. What does this method have in common with a signal detection experiment and what are the important differences between the two? [5 pts]



16. Which of the three tuning curves shown above was obtained by recording from a neuron connected to cells nearer to the stapes? _____
17. In the above figure, Curve C is sharper than Curve A because
- even at high amplitudes, low frequency tones stimulate a relatively small area on the basilar membrane.
 - even at high amplitudes, high frequency tones stimulate a relatively small area on the basilar membrane.
 - high-frequency neurons are more sensitive than low-frequency neurons.
 - it is obtained from a neuron connected to cells nearer the helicotrema.



18. Using the Fletcher-Munson curves above, answer the following questions: [2 pts]

- Which sound is louder, 100 Hz at 20 dB or 1000 Hz at 10 dB? _____
- You play music at 40 dB, which frequencies will you not hear? _____
- Which sound is louder, 1000 Hz at 40 dB or 20 Hz at 80 dB? _____
- To make a 1000 Hz tone as loud as a 100 Hz tone at 60 dB, it would be at _____ dB.

19. Respondent A gets 30% False Alarms and 80% Hits. Respondent B gets 30% False Alarms and 90% Hits. Which respondent is more sensitive? Why?

20. 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 nonspeech qualities.
- clearly illustrates the effects of top-down processing on speech perception.

21. /p/ is a
- voiced consonant.
 - voiceless consonant.
 - articulated consonant.
 - none of the above.
22. If two tones playing simultaneously produced dissonance, what could you do that typically makes them more consonant?
- Play them at a lower amplitude.
 - Change the amplitude of one of the tones.
 - Add a third tone.
 - Change the frequency of the tones so they form a simple ratio.
23. Rachel is first presented with one tone and then a second tone that originates a short distance from the source of the first. She reports, however, that they both come from the same source. Why may this be?
- She has had some inner hair cell damage.
 - She is experiencing auditory adaptation.
 - The two tones are separated by less than the minimum audible angle.
 - The two tones are separated by more than the minimum audible angle.
24. Why is the cone of confusion a problem for localization?
- The head is large enough that it creates interaural time differences.
 - The head is large enough that it creates phase differences.
 - High frequency tones especially lead to interaural intensity differences.
 - All sounds originating from this area have the same interaural differences.
25. What phenomenon can be explained by neurons (somewhere between the cochlea and the auditory cortex) being activated by perceived pitch rather than the frequency information present at the cochlea?
- fundamental frequency
 - complex tone
 - harmonics
 - missing fundamental
26. If you were to remove all the harmonics from a tone,
- you would be left with a pure tone.
 - you would be left with a complex tone.
 - you would create the illusion of the missing fundamental.
 - you would hear no sound at all.