

ID# _____
(Be sure to use your REAL Student ID #)

Exam 2

PS 325, Fall 2000

OK, you know the drill. Read each question carefully and answer completely. Thanks for an enjoyable semester. Have a wonderful break. May the joys of this holiday season fill your senses!

Peace,

Answer the essay questions on the lined paper at the end of the exam.

Essay 1: What evidence would you provide to illustrate the operation of top-down processes in senses other than vision? [20 pts]

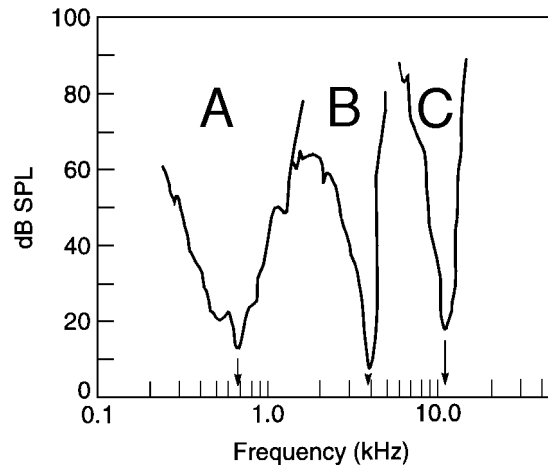
Essay 2: Some animals are better able to localize sounds in the environment, and they are often nocturnal predators. What experiments have demonstrated this ability? Also, what mechanisms are responsible for this talent, and how have the prey of these organisms adapted? [20 pts]

1. The radiologists think that an x-ray of region in the lung shows no abnormality, but indeed the region is abnormal. In signal detection terms, they made a
 - a. hit.
 - b. correct rejection.
 - c. false alarm.
 - d. miss.

2. The method of constant stimuli)
 - a. involves a consistent movement from intense to less intense stimuli.
 - b. is most likely to produce errors of habituation and errors of anticipation.
 - c. presents the stimuli in random order.
 - d. is the least reliable of the psychophysical methods.

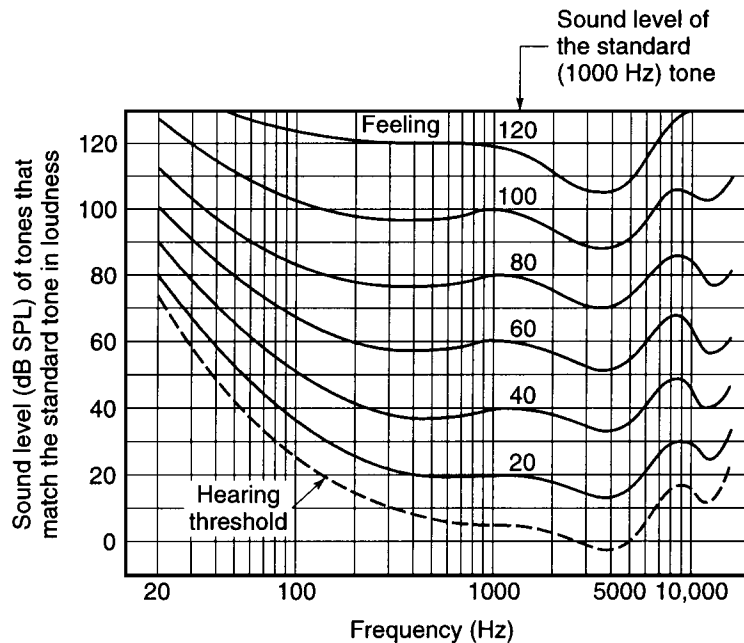
3. A person with a high sensitivity and a high criterion in a signal detection study
 - a. will be less likely to have a high false alarm than a person with a high sensitivity and a low criterion.
 - b. will be more likely to have a high false alarm than a person with a high sensitivity and a low criterion.
 - c. will make more hits than a person with a high sensitivity and a low criterion.
 - d. will make more false alarms than a person with low sensitivity and a low criterion.

4. According to Békésy's research on place theory, why does the traveling wave die out more rapidly near the stapes?
- Because the basilar membrane is stiffer near the stapes than near the helicotrema.
 - Because the basilar membrane is more relaxed near the stapes than near the helicotrema.
 - Because a wave that travels as far as the stapes is unable to gather strength from external stimuli.
 - None of the above.

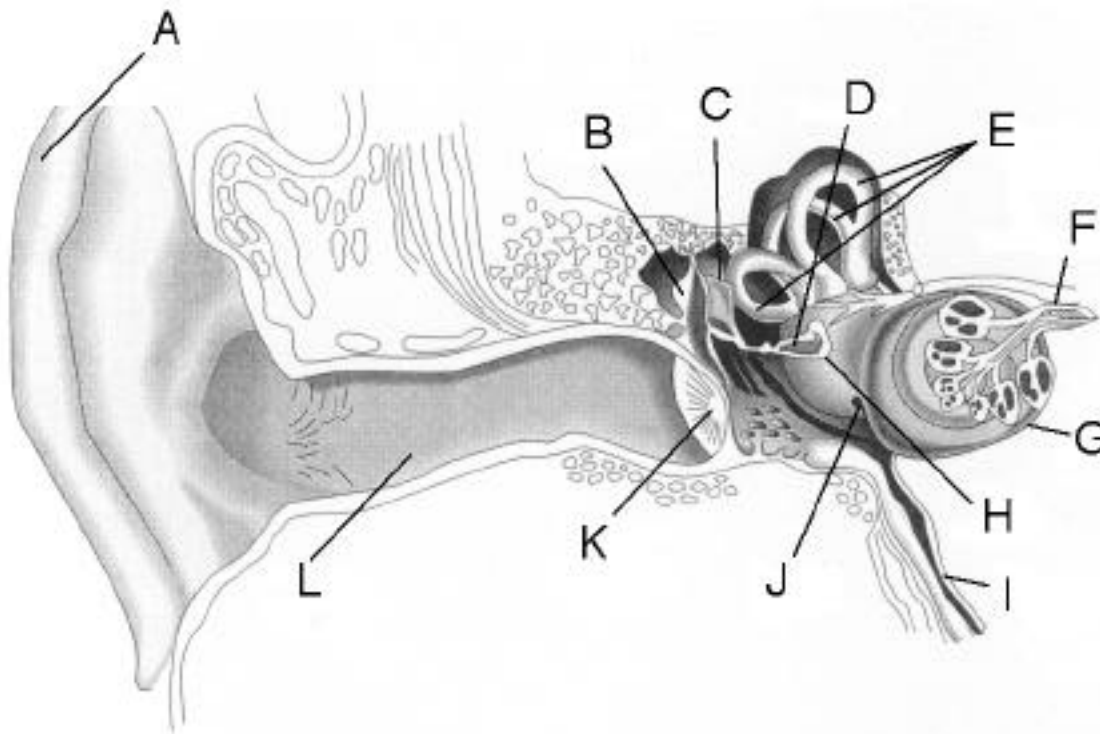


5. Which of the three tuning curves shown above was obtained by recording from a neuron connected to cells nearer to the stapes? _____
6. In the above figure, Curve C is sharper than Curve A because
- even at high amplitudes, low frequency tones stimulate a relatively small area on the basilar membrane.
 - 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.
7. Chapter 11 discussed in some detail a study by Krumhansl that used the probe-tone technique to indicate which tones fit best within a given key. Her study showed that the tones that fit best were
- almost always played in sequence in popular music.
 - the ones that were most likely to occur in musical compositions in that key.
 - typically avoided in music in Western cultures.
 - typically dissonant when any two of these tones were played simultaneously.
8. Which of the following features would you expect to find on a speech spectrogram?
- the word superiority effect
 - speech constancy
 - hits and false alarms
 - formants

9. Which of the following statements about frequency and hearing is correct?
- Humans cannot generally hear frequencies lower than 10,000 Hz.
 - Humans are particularly sensitive in detecting tones in the 2000-5000 Hz range.
 - Humans have relatively large difference thresholds for hearing, in contrast to the difference thresholds for smell and taste.
 - Humans notice changes in the frequency of a tone better in the high-frequency range than in the low-frequency range.
10. 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' .
11. Suppose two sound waves identical in frequency and amplitude are in phase. When played together, they would produce
- no sound — they would in effect cancel each other out.
 - beats at a lower frequency than either of the two waves alone.
 - a sound of that frequency, but higher in amplitude than either sound alone.
 - a sound higher in frequency than either of the two waves alone.
12. 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.
13. Which of the following statements about speech perception is correct?
- It is easier to identify speech if the context is missing.
 - Context always increases the accuracy of identifying the physical stimulus.
 - If a phoneme is missing from a word, listeners typically cannot identify the word correctly.
 - People have difficulty identifying an isolated word that had been spoken in their own previous conversations.
14. Compared to a nearby sound source, if a sound source is 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.



15. Based on the Fletcher-Munson curves above, answer the following questions: [2 pts]
- If an amplifier were playing music at 30 dB, what frequencies would you hear?
 - A 30-Hz tone is played at 70 dB and a 200-Hz tone is played at 40 dB.
Which tone would sound louder?
 - A 100-Hz tone is played at 50 dB and a 500-Hz tone is played at 20 dB.
Which tone would sound louder?
 - What amplitude would you set a 1000-Hz tone to in order to make it as loud as a 20-Hz tone at 100 dB?
 - An 80-Hz tone would need to be set at _____ dB to be as loud as a 40-Hz tone at 60 dB.
16. What is the basic message that one should take from the Fletcher-Munson curves above? [2 pts]
17. 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.



18. 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 |

19. 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 |

20. Auditory localization takes place because of differences in the auditory experiences of the two ears, or the lack thereof. [5 pts]

If the auditory information in the two ears is consistent, what does that signal about the location in space of a sound source?

What are the cues that can lead us to perceive where in space a sound source may be located?

Which cue works equally well for high and low frequency sounds?

21. The McGurk effect is quite interesting. At the same time, it tells us a lot about the functioning of our auditory system. Briefly describe the effect and then tell me why the effect is important. [5 pts]

22. As illustrated in the music video, Diana Deutsch has studied the octave illusion. Briefly describe the octave illusion and then tell me why the illusion is interesting from the perspective of a cognitively oriented psychologist. (In other words, how does the illusion illustrate the operation of cognitive processes that are more important than the actual physical stimulation of the sensory system.). [5 pts]