

ID# \_\_\_\_\_  
(You *must* use your actual student ID#)

Exam 2

PS 325, Fall 2001

As was true on the first exam, you should read each question carefully and answer as completely as you can. Use the attached lined sheets to answer the essay questions. Again, think of a point as a minute, which means that you should spend about 20 minutes on your answers to each of the essay questions. Good luck on the exam! Have a wonderful break! I'll see (most of) you during the spring semester. Peace...

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

**Essay 2:** Describe signal detection theory, and illustrate the advantages of signal detection theory over classical threshold theory. How would a signal detection experiment differ from an experiment using the method of constant stimuli? [20 pts]

1. A pure tone

- a. is a common natural phenomenon.
- b. is represented by a simple sine wave.
- c. is typically produced by a musical instrument.
- d. is typically produced by a high-quality stereo receiver.

2. /p/ is a

- a. voiced consonant.
- b. voiceless consonant.
- c. articulated consonant.
- d. none of the above.

3. A combination of two or more notes that is judged to be pleasant is called

- a. consonance.
- b. dissonance.
- c. harmonies.
- d. overtones.

4. Suppose that you are listening to the radio, and a very brief squeak comes from the radio in the middle of one word. Nonetheless, you perceive the word as if it were perfectly intact. The phenomenon in Chapter 11 that this situation most closely resembles is

- a. parallel transmission.
- b. phonemic restoration.
- c. the octave illusion.
- d. the ABX paradigm.

5. The ventriloquism effect

- a. refers to the fact that ventriloquists can throw their voices while drinking.
- b. leads to a higher pitch sound coming from the dummy's head.
- c. refers to the fact that visual information influences auditory localization.
- d. leads to increased minimum audible angles.

6. What is a module?

- a. A phenomenon in which a speech sound is missing but listeners do not perceive it as missing.
- b. A specialized mechanism designed to perform a particular task, like speech perception.
- c. Part of a sound spectrogram.
- d. The basic unit of speech.

7. In categorical perception

- a. people have trouble discriminating between members of different categories.
- b. people have trouble telling whether a particular sound is the end of one word or the beginning of the next word.
- c. people are very good at discriminating between two examples of the same phoneme.
- d. people have trouble discriminating between members of the same category.

8. Your head creates more of an interaural intensity difference for

- a. high frequency sounds
- b. low frequency sounds
- c. low amplitude sounds
- d. high amplitude sounds

9. If Mary has a high threshold for tasting solution #1 and low sensitivity for tasting solution #2, we can say that she has

- a. low sensitivity for solution #1 and a high threshold for solution #2.
- b. high sensitivity for solution #1 and a low threshold for solution #2.
- c. low sensitivity for solution #1 and a low threshold for solution #2.
- d. high sensitivity for solution #1 and a high threshold for solution #2.

10. Why is the cone of confusion a problem for localization?

- a. The head is large enough that it creates interaural time differences.
- b. The head is large enough that it creates phase differences.
- c. High frequency tones especially lead to interaural intensity differences.
- d. All sounds originating from this area have the same interaural differences.

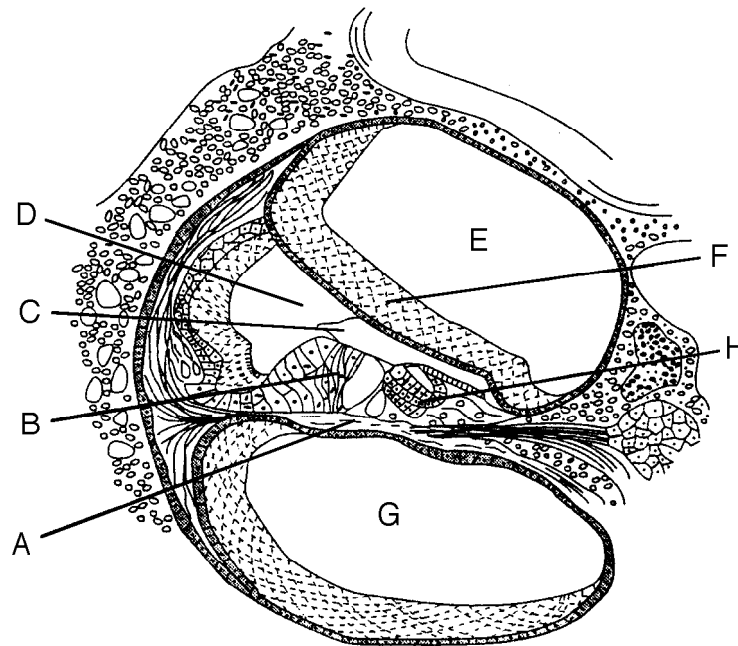
11. What would be the effect of blinding a bat?

- a. It could no longer fly at night.
- b. It could no longer hunt its prey.
- c. It could still fly and hunt using echolocation.
- d. Bats are already blind so it wouldn't change anything.

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. Parts of the auditory system are arranged tonotopically, meaning that
- similar tones are heard when listening to output from single cell recordings.
  - neurons sensitive to similar frequencies are found near one another.
  - melodies for similar songs are stored near one another
  - neurons sensitive to adjacent spatial locations are found near one another.
14. According to the frequency theory of pitch perception
- the entire basilar membrane vibrates at the same frequency as the tone stimulating it.
  - each frequency causes a different part of the basilar membrane to vibrate.
  - the eardrum vibrates at the same frequency as the tone stimulating it.
  - perception can't occur unless the tone is greater than 2000 Hz.
15. Which of the following statements *best* summarizes the transduction process of the auditory system?
- The traveling wave carried by the basilar membrane causes displacement of the stereocilia, which ultimately culminates in the production of action potentials.
  - The differences in air pressure carried by sound waves directly cause the hair cells to begin vibrating at the same rate which ultimately culminates in the production of action potentials.
  - A system of afferent and efferent fibers between the inner ear and the brain enables transduction to occur.
  - The auditory system does not need to perform a transduction process.
16. Research on top-down processing in speech perception shows that
- when listeners are told that they will be hearing speech, they are more likely to perceive accurately.
  - phonemes can be identified more accurately when they are part of a nonsense word than when they are part of a normal word.
  - the other sounds of a word are helpful in identifying a phoneme, but the other words in a sentence are not particularly helpful.
  - visual information about lip movements is not particularly useful for speech perception.

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 nonspeech qualities.
  - clearly illustrates the effects of top-down processing on speech perception.
18. 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
19. \_\_\_\_\_ is the smallest amount of energy required for the stimulus to be reported 50% of the time.
- The ascending method of limits
  - The absolute threshold
  - The adaptation level
  - The criterion
20. It is difficult to explain why humans are so accurate in their speech perception because
- our sensory apparatus is inaccurate for perceiving stimuli in that range of frequency.
  - the speech stimulus exhibits tremendous variability.
  - we do not hear segmentation between words, even though analysis of the physical stimulus shows clear segmentation.
  - top-down processes do not appear to operate in speech perception.
21. In a classic study on phonemic restoration, Warren and Warren cut a phoneme out of a recorded sentence and inserted a coughing sound in the gap. What did the listeners report hearing?
- They accurately reported that the phoneme was missing and the cough was inserted.
  - An additional phoneme seemed to have been inserted, other than the one that had been removed.
  - They could not perceive the cough, even when they were warned that it would be present.
  - They reported that the sentence was intact.
22. The perceptual systems do not always work in isolation — they often interact. Which of the following *most* supports this statement?
- the McGurk effect
  - phonemic restoration
  - duplex perception
  - transposition

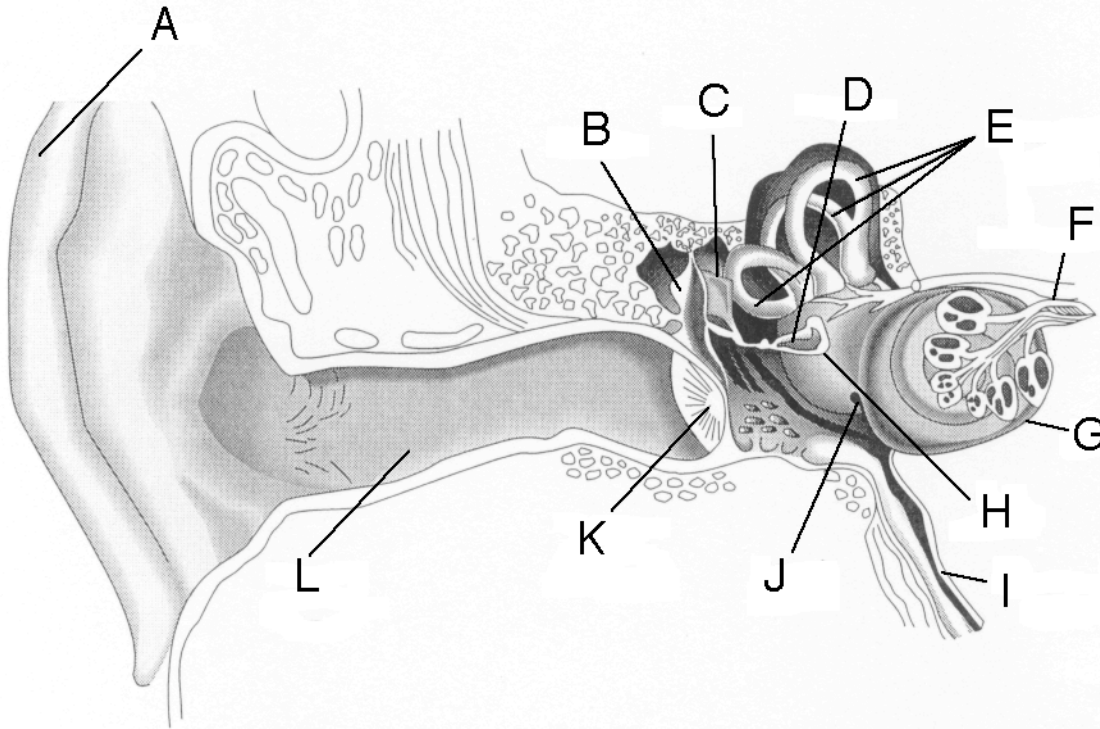
23. Provide one very clear example of a context effect in auditory perception. [5 pts]



24. Use the figure above to label the parts of the inner ear shown below. [2 pts]

- \_\_\_\_\_ Tectorial Membrane
- \_\_\_\_\_ Inner Hair Cells
- \_\_\_\_\_ Reissner's Membrane
- \_\_\_\_\_ Basilar Membrane
- \_\_\_\_\_ Outer Hair Cells
- \_\_\_\_\_ Cochlear Duct

25. Studies on the relationship between odors and the menstrual cycle suggest that
- odors produced by one woman can sometimes regulate the menstrual cycles of other women.
  - although hormones are critically important in the menstrual cycle, odors have no effect.
  - in the study on the influence of one woman's odors on the menstrual cycles of other women, women in a control group showed the same pattern in their menstrual cycles as women in the experimental group.
  - odors influence the menstrual cycle only in laboratory settings.
26. Which of the following is *not* true of inner ear hair cell motility?
- Motility is due to the presence of muscle-like actin filaments in the walls of the outer hair cells.
  - Motility is the independent elongation and contraction of the outer hair cells.
  - Motility is characteristic of inner and outer hair cells.
  - Motility may serve to sharpen contours of traveling waves.
27. Your uncle who has been taking large doses of aspirin for his arthritis complains of ringing in his ears. Of the choices below, what is his most probable diagnosis?
- tinnitus
  - presbycusis
  - eustachian disorder
  - conduction deafness
28. Pheromones
- are chemical signals processed in the mouth and olfactory epithelium.
  - allow chemical signals to pass across species.
  - allow chemical signals to pass from one part of the body to another.
  - are chemical signals processed in the vomeronasal organs.
29. What is the function of the three bones in the middle ear?
- They change the auditory stimulus into a chemical signal.
  - They amplify the vibrations entering the inner ear.
  - They hold the receptors that receive the sound waves.
  - They connect the ear canal to the throat passage.
30. The pinnae serve to
- reduce sound amplitude
  - increase the rate of travel of sound waves though the external auditory canal
  - decrease the rate of travel of sound waves though the external auditory canal
  - localize sound



31. Match the labels from the figure above to each of the following parts of the auditory system: [3 pts]

- |                               |                        |
|-------------------------------|------------------------|
| _____ Pinna                   | _____ Round Window     |
| _____ Cochlea                 | _____ Malleus (Hammer) |
| _____ Eardrum                 | _____ Eustachian Tube  |
| _____ Stapes (Stirrup)        | _____ Incus (Anvil)    |
| _____ External Auditory Canal | _____ Oval Window      |

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

- |       |  |
|-------|--|
| _____ | 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                    |

33. OK, you've been through the whole exam. It's now the last question of the course. I've asked you all sorts of questions, but I bet that you know something that you wish that I'd asked you. Ask yourself that question and answer it! (Correctly, please. ☐ ) [And it must be different from all the other questions on the exam.]