Good luck on this exam. Answer each question carefully and completely. Keep your eyes foveated on your own exam, as the Skidmore Honor Code is in effect (as always). Have a joyous holiday season!

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

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

2. Match the labels from the figure above to each of the following descriptions: [4 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
   - ______ Important for a sense of balance
   - ______ Site of transduction of the sound pressure energy
   - ______ Drain plug to relieve middle ear fluids (from infection) is inserted here
3. Suppose that a study using classical psychophysics showed that women who have participated in prepared childbirth classes have lower thresholds for pain than control women. Why might a variation of that study using the signal detection theory be valuable?
   a. SDT could give us a more accurate estimate of the just noticeable difference.
   b. SDT could tell us whether the difference was due to a difference in sensitivity or a difference in criterion.
   c. SDT would provide more accurate thresholds.
   d. SDT would provide quicker thresholds.

4. What is the function of the three bones in the middle ear?
   a. They change the auditory stimulus into a chemical signal.
   b. They amplify the vibrations entering the inner ear.
   c. They hold the receptors that receive the sound waves.
   d. They connect the ear canal to the throat passage.

5. Our middle ear muscles complement the ossicles by,
   a. contracting reflexively after the ear is exposed to any sound.
   b. contracting reflexively after the ear is exposed to sounds about 80 dB over threshold.
   c. further amplifying all sounds.
   d. amplifying sounds when the ossicles become fatigued.

6. In Chapter 11, several studies by Samuel were discussed. These studies demonstrated that
   a. phonemic restoration is stronger for short words than for long words.
   b. in a well-controlled study, phonemic restoration does not operate.
   c. greater amounts of context produce greater phonemic restoration.
   d. vowels are particularly likely to show phonemic restoration.

7. On a cold winter morning, you are anxiously awaiting the arrival of a bus. You are listening intently for the bus’s growling engine, but you are hampered somewhat by the muffler you are wearing over your ears. In signal detection terms, you probably have
   a. increased sensitivity and a relatively low criterion.
   b. decreased sensitivity and a relatively low criterion.
   c. increased sensitivity and a relatively high criterion.
   d. decreased sensitivity and a relatively high criterion.

8. Double pain is
   a. the amount of pain felt when a person has taken a placebo.
   b. the reduction in pain caused by applying a counterirritant.
   c. likely due to the speed difference between A-delta fibers and C-fibers.
   d. pain perception in an amputated limb.

9. Which of the following statements about phantom limb experience is true?
   a. People who had been born without limbs experienced phantom limb experience.
   b. Phantom limb experience is due to learning to use a limb.
   c. Phantom limb experience is due to processing input from the limb.
   d. None of the above.

10. An important conclusion from Weber’s law is that
    a. the just noticeable difference is always a constant.
    b. when we start with an intense stimulus, we must make a large change in that stimulus in order for a change to be noticed.
    c. Weber’s fraction is the same for all sensory systems.
    d. a one-to-one correspondence exists between physical stimuli and psychological reactions.
11. Which of the following statements is most supportive of the Special Mechanism account of speech perception?
   a. Categorical perception has been shown to operate for many kinds of auditory sounds other than speech.
   b. Lip movements seem to play a role in our ability to perceive speech.
   c. We are better able to perceive speech when we know the topic of conversation.
   d. People perform better on speech identification tasks when they know beforehand that the stimulus they are going to hear is speech.

12. Which of the following statements about music perception is most in keeping with the Gestalt approach?
   a. A series of alternating high- and low-pitched notes played quickly will be perceived as two distinct melodic lines.
   b. We are much quicker in naming a song that we have heard before as opposed to one we haven’t.
   c. The experience and knowledge that the listener possesses will have a strong influence on the way he or she perceives music.
   d. In the discrimination of complex sounds, people perform substantially better after receiving training.

13. Use the figure above to answer the following questions. (Curves are labeled with numbers, and respondents are labeled with letters.) [3 pts]
   Which curve indicates the greatest sensitivity?
   Which curve would be obtained from a complete overlapping of the Noise and Signal + noise distributions?
   Along curve 2, which respondent is the most conservative?
   Which respondent appears to be guessing?
   Along which curve would a respondent obtain the highest ratio of hits to false alarms?

14. In the video about music perception, the segment on the trumpet illustrated an important point that was evident again in the artificial singing voices. That is, as amplitude increased, what happened? [2 pts]
15. What is the importance of the Fletcher-Munson curves? [2 pts]

16. According to Ronald Melzack, the source of phantom limb experience is
   a. the configuration of neurons called the neuromatrix.
   b. severed neurons that remain in the stump of the amputated limb.
   c. the transmission cells in the spinal cord.
   d. both a & b.

17. 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?
   a. She has had some inner hair cell damage.
   b. She is experiencing auditory adaptation.
   c. The two tones are separated by less than the minimum audible angle.
   d. The two tones are separated by more than the minimum audible angle.

18. Which of the following characteristics of sound is not represented directly on the basilar membrane?
   a. frequency
   b. amplitude
   c. auditory space
   d. complexity

19. 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.

20. 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.

21. Loss of efferent fibers would result in
   a. the inability of the brain to send messages to the hair cells.
   b. the inability of the hair cells to send messages to the brain.
   c. reduced sensitivity to certain frequencies.
   d. conduction deafness.

22. Which of the following statements about the auditory system represents a similarity in the way that the auditory and visual perceptual systems operate?
   a. The eardrum vibrates in response to changes in air pressure.
   b. The hair cells contain even smaller hairlike projections called stereocilia.
   c. The basilar membrane produces a traveling wave which then stimulates the hair cells.
   d. The inner and outer hair cells do not share the auditory nerve fibers equally.
23. Which of the following statements is correct?
   a. Studies of phantom-limb pain tend to support specificity theory.
   b. Almost all patients in an emergency clinic felt intense pain at the time of injury; this observation supports specificity theory.
   c. Gate-control theory proposes that cognitive factors influence pain perception.
   d. Pattern theories of pain perception argue that pain is produced by stimulating specific pain receptors, which transmit information to the brain’s pain center.

24. In a classical psychophysical experiment (e.g., constant stimuli), on every trial (except catch trials) a signal is present, but in a signal-detection experiment some trials contain __________ and other trials contain __________.

25. The function of the inner hair cells is to
   a. filter out particles of dirt and other small objects that could damage the structure of the inner ear.
   b. transmit auditory information to higher levels of processing.
   c. provide a protective covering for the auditory receptors.
   d. help overcome the impedance mismatch problem.

26. Research on absolute thresholds for passive touch shows that
   a. these thresholds are the same as the ones measured by two-point discrimination threshold techniques.
   b. women are significantly more sensitive to touch than men are.
   c. the various parts of the body are remarkably similar in their sensitivity.
   d. for both men and women, stomachs and backs are extremely sensitive to touch.

27. Research on two-point discrimination thresholds has demonstrated that
   a. regions of the body that have low two-point thresholds correspond to large areas of the cortex.
   b. no consistent relationship is found between regions of the cortex and two-point thresholds.
   c. the thresholds are higher for regions of the body closest to the head; they are lower for regions closest to the feet.
   d. the spinothalamic system has the most precise two-point thresholds.

28. Which word is most characteristic of the manner in which the auditory system is organized?
   a. retinotopically
   b. physically
   c. randomly
   d. tonotopically

29. 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?
   a. pitch
   b. loudness
   c. timbre
   d. frequency

30. According to current theorizing, how is amplitude registered by the auditory system?
   a. The greater the amplitude of the incoming wave, the more vigorously the neurons all along the basilar membrane will fire.
   b. High amplitude waves maximally stimulate the basilar membrane at one end while low amplitude waves maximally stimulate the opposite end.
   c. The basilar membrane will vibrate at the same amplitude as the incoming wave.
   d. The greater the amplitude of the incoming wave, the greater the number of outer hair cells that will be stimulated.
For the two essays, you can answer on the page below or you can use lined paper. In either case, please be as neat as possible. With each essay worth 20 pts, you should expect to use roughly 20 minutes to write your essays.

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

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