Instructions:

• Write your name on each page.

• There are a total of 24 questions.

• Each instructor’s questions appear together, below that instructor’s name.

• For fill in the blank, write clearly.

• For multiple choice, circle the letter of the correct answer. This must be done clearly or it will be marked wrong. There is ONLY ONE correct answer per multiple choice question.

• No partial credit for partly correct answers.
1. Which of the scenarios below describes an experimental design that appropriately combines methods from auditory physiology with those from psychology to test whether learning causes plasticity of frequency tuning in primary auditory cortex (A1)?

   a. (1) train subject with one stimulus of interest
      (2) test A1 tuning with many stimuli
   b. (1) train subject with many stimuli
      (2) test A1 tuning with one stimulus of interest
   c. (1) test A1 tuning with one stimulus of interest
      (2) train subject with many stimuli
      (3) test A1 tuning with the same stimulus of interest
   d. (1) test A1 tuning with many stimuli
      (2) train subject with one stimulus of interest
      (3) test A1 tuning with many stimuli

2. Consider the following experiment. Subjects were trained with tones that were either paired or unpaired with acetylcholine release (ACh) in A1. Behavioral responses (respiration change, as shown on the Y-axes) to each one of many different frequencies (as shown on the X-axis) were recorded after training. As expected, animals that were trained with tones UNpaired with ACh did not learn (i.e., the change in respiration behavior was not high). The data are shown below:

   From the data shown when ACh is paired with tones, we may conclude that different levels of acetylcholine release in A1 determine the _____ of auditory memory.

   a. nucleus basalis
   b. specificity
   c. duration
   d. strength
3. Name three characteristics that are common to auditory cortical tuning shifts (that is, receptive field shifts) and auditory memory:

   (1) ____________________
   (2) ____________________
   (3) ____________________

4. Which of the following statements is FALSE?
   Auditory cortex…

   a. can represent the level of importance of a sound
   b. always changes when an animal learns an auditory task
   c. is different in experienced musicians vs. non-musicians
   d. does acoustic analysis
   e. constructs a musical experience

5. Unlike a visual experience like a painting or a photograph, a musical experience unfolds over time. This means that music appreciation requires ______.

   a. effective detection of interaural time differences
   b. perfect pitch
   c. Area MT in the dorsal pathway
   d. memory

6. Melody has been found to be processed by a specialized module in the right hemisphere of the brain. Rhythm however is processed in the left hemisphere. What does this provide evidence for?

   a. Music is made up of different components, which are processed separately in the brain.
   b. There are no special brain areas for music.
   c. Like “auditory cortex”, the brain has a “music cortex”.
   d. People with amusia suffer from the same brain dysfunction.
   e. Melody is more important than rhythm in identifying music.
7. Which of the following constitutes evidence for the bilateral organization of speech sound perception?
   a. word deafness involves damage to the superior temporal lobe bilaterally
   b. unilateral brain damage does not cause auditory language comprehension deficits
   c. deactivation of the *right* hemisphere in WADA procedures produces severe auditory comprehension deficits
   d. all of the above
   e. a & b only

8. Which of the following is/are true regarding the sensory-motor integration network that supports aspects of speech processing?
   a. it appears to be relatively selective for the vocal-tract motor system
   b. it is left hemisphere-dominant
   c. it is not speech specific
   d. all of the above
   e. a & b only

9. True or False? The dorsal auditory stream is exclusively dedicated to spatial "where" functions in hearing.

10. Evidence that the perceptual speech system plays a role in speech production includes...
    a. the observation that damage to the superior temporal gyrus on the left can produce speech production deficits
    b. late onset deafness (i.e., deafness that occurs in adulthood) leads to a decline in speech articulation abilities
    c. altered or delayed auditory feedback has no impact on speech production
    d. a & b only
11. Name the brainstem nucleus that is primarily responsible for detecting interaural level differences: ___________________. Based on what you know about interaural level differences, indicate whether the majority of cells in that nucleus respond primarily to low or high frequencies (circle one).

12. Which of the following experimental manipulations would disrupt accurate sound localization in the vertical dimension by a human listener:

   a. fill the folds of the external ear with putty, being careful to keep the ear canal open
   b. filter the sound to a narrow 1/6-octave-wide bandwidth
   c. filter the sound to eliminate frequencies above 6 kHz
   d. all of the above

13. Name a structure in the mammalian brain that contains a topographic map of auditory space ___________________________.

14. Indicate by marking “T” or “D” whether the following properties of neurons in various auditory midbrain and cortical structures are more consistent with a topographical [T] or distributed [D] representation of auditory space:

   a. Spatial sensitivity varies systematically within a particular brain structure as a function of location within that brain structure: ___
   b. Neurons respond differentially as a function of sound location throughout up to 360° of auditory space: ___
   c. Sound sources at two distinct locations elicit brain activity at two discrete brain locations: ___
15. One reason that understanding the maturational path for language acquisition is a complex research question is that:
   a. Sensory systems in the brain do not mature until adolescence
   b. Language is not a unitary system, but has many different and complex aspects
   c. It is difficult to measure language production in children
   d. All of the above

16. A central issue in language acquisition research is:
   a. Whether all children acquire the same phonemes at the same age
   b. Whether the brain is ‘pre-wired’ or predisposed for language, or if language is acquired strictly due to the child’s experience
   c. Whether different aspects of grammar are learned differently in different cultures
   d. Whether or not children acquire receptive language prior to productive language

17. Evidence for a staged acquisition of aspects of language has been provided by studies showing that:
   a. Infants and toddlers learn to discriminate word meanings before they learn to discriminate word boundaries
   b. Infants can discriminate the phonemes of their own language early in infancy but by 8-10 months of age, they can also discriminate phonemes of other languages
   c. Toddlers are able to discriminate between known words and phonetically similar words at 20 months of age, but not at 14 months
   d. All of the above

18. Between 7 and 10 months of age, infants learn to recognize:
   a. Phonemes from other languages
   b. Both strong and weak syllabic stress patterns
   c. Syntactic (grammatical) structure at the phrase-level
   d. The difference between words and nonwords
Dr. Starr

19 Auditory Brainstem Responses (ABRs) that can be recorded from scalp electrodes measures potential generated by which structures

a. auditory nerve  
b. cochlear nucleus  
c. auditory cortex  
d. a and b  
e. all of the above

20. The hearing disorder of patients with auditory neuropathy predominantly affects

a. threshold for high frequency tones  
b. speech comprehension  
c. gap detection thresholds  
d. b and c  
e. a and b

Dr. Djalilian

21. What is the youngest age approved by the Food and Drug Administration for cochlear implantation?

a. 18 years  
b. 10 years  
c. 1 year  
d. No age limit

22. What is the critical age range for learning language?

a. 1 to 4 years  
b. 4 to 8 years  
c. 1 to 12 years  
d. 1 to 18 years

23. The dynamic range in people with sensorineural hearing loss typically is:

a. shifted to higher intensities  
b. compressed  
c. expanded  
d. shifted to lower intensities
24. Some state-of-the-art hearing aids:

   a. amplify loud and soft sounds differently
   b. favor sounds directly in front of the patient
   c. subtract sounds coming from the side of the patient
   d. all of the above