Psych 150 / Ling 155 – Exam 1

Section 1: Matching (2 points each)

Below you will find a list of terms and phrases labeled by letters, and a list of statements with terms or phrases missing. Please match the appropriate term or phrase to the appropriate statement by writing the letter of that term on your answer sheet. Not all of the terms will be used.

a. spectrogram  
b. language  
c. manner of articulation  
d. amplitude  
e. frequency  
f. resonance  
g. mental representation  
h. vowel  
i. McGurk effect  
j. harmonics  
k. consonant  
l. formant  
m. M100  
n. place of articulation  
o. MMF  
p. lack of invariance  
q. height  
r. voicing  
s. intermediate representation  
t. Restoring the fundamental  
u. sine wave speech  
v. California Vowel Shift  
w. fundamental frequency

1. Language is a cognitive system that links two __s : sensory and conceptual.

2. __s are the most prominent resonance bands created by the vocal tract.

3. The __ is a neuromagnetic response generated by the auditory cortex that can be used to diagnose differences and similarities between speech sounds.

4. The __ is a neuromagnetic response generated by the auditory cortex as a response to all auditory stimuli, whose latency varies with the frequency of the sound.

5. __ is an articulatory distinctive feature with values such as stop, nasal, fricative, and affricate.

6. __ is an articulatory distinctive feature describing the activity of the vocal folds during the articulation of a consonant.

7. A __ is a visual representation of the frequencies that are present in a sound.

8. __ is a phrase used to describe the fact that there is no 1:1 correspondence between the speech sounds that we perceive and the acoustic properties of those sounds.

9. __ is an auditory illusion that may be evidence for the articulatory distinctive feature approach to speech perception.

10. __ is an auditory illusion that provides evidence for the types of computations that the auditory cortex can perform to derive additional information from the acoustic signal.
**Section 2: Multiple Choice (3 points each)**

*Please select the best answer for each question from the list of answers provided.*

11. Three of these properties of sound are largely irrelevant to speech perception. One is critical. Which property is critical:

   a. amplitude  
   b. resonance bands  
   c. fundamental frequency  
   d. wavelength

12. Which of these is **not** a prediction of the **acoustic approach** to speech perception:

   a. The auditory cortex will be able to restore a missing fundamental frequency  
   b. All that is necessary for speech perception are the formants  
   c. There will be a single definition for each speech sound  
   d. There will be a unique definition for each speech sound

13. Take a look at this graph. Which prediction of the acoustic approach to speech perception appears to be falsified (proven false) by this graph:

   ![Graph](image)

   blue = adult males  
   red = adult females  
   purple = young males  
   orange = young females

   **NOTE:** This graph needs to be in color for you to use it. Please look at the graph projected on the screen so you can see the colors.

   a. The auditory cortex will be able to restore a missing fundamental frequency  
   b. All that is necessary for speech perception are the formants  
   c. There will be a single definition for each speech sound  
   d. There will be a unique definition for each speech sound
14. Which process can be used to resolve the problem for the acoustic approach to speech perception discussed in the previous question:
   
a. Restoring the missing fundamental frequency  
   b. F3 standardization  
   c. Locus equations  
   d. None. This problem requires a different approach to speech perception.

15. Take a look at this new graph. Which prediction of the acoustic approach to speech perception appears to be falsified (proven false) by this graph:

   ![Graph](image)

   NOTE: This graph does not need to be in color, but color makes it easier to read. A colored version is projected on the screen.

   a. There will be a unique definition for each speech sound  
   b. There will be a single definition for each speech sound  
   c. The auditory cortex will be able to restore a missing fundamental frequency  
   d. All that is necessary for speech perception are the formants

16. Which process can be used to resolve the problem for the acoustic approach to speech perception discussed in the previous question:

   a. Restoring the missing fundamental frequency  
   b. F3 standardization  
   c. Locus equations  
   d. None. This problem requires a different approach to speech perception.
17. Which of these facts is not an example of the lack of invariance problem?

a. The consonant /d/ causes F2 to lower before /i/ and to raise before /u/
b. There are speakers who pronounce /æ/ with an F1 of 600Hz and an F2 of 2000Hz, and speakers who pronounce /ɛ/ with an F1 of 600Hz and an F2 of 2000Hz
c. A burst of sound at 1400Hz is perceived as /p/ before /i/, and as /k/ before /ɑ/
d. Both vowels and musical chords are complex tones, but are perceived differently

18. Take a look at this partial diagram of the Standard American English vowel chart. It shows the location of five vowels. According to the articulatory distinctive feature approach to speech perception, three of these vowels are fully specified for both height and backness, and two are unspecified for at least one feature. Only one vowel in the following list is unspecified for at least one feature. Which is it?

![Vowel Chart]

- a. ɛ
- b. i
- c. æ
- d. u

19. Again, look at the SAE vowel chart in question 18. The following are four experimental designs for a Mismatch Negativity (MMN) experiment. Three would yield a large MMN. One would not. Use your knowledge of the articulatory distinctive feature approach and identify the one experiment that would not yield a large MMN:

a. i i i i u
b. u u u u i
c. u u u u ə
d. ə ə ə u

20. Ultimately we need to map from acoustic properties to distinctive features. Locus equations may do this for one distinctive feature. Which one?

a. Place of articulation
b. Manner of articulation
c. Voicing
d. Tongue Height