Psych 3A03 (Audition) Writing Assignment #1 (5% of total grade)

Instructions

1. There are two parts to this assignment. You must answer **ONE** item from each part.
2. Please type your name and MU student ID number at the top of your assignment.
3. Use complete sentences and/or paragraphs to write your answer. Do **NOT** use point form.
4. The maximum length of this assignment is **TWO PAGES** typed, **DOUBLE SPACED**, using a minimum of a 12-point font with a 1" page margin all around. You may include 1 additional page for references. We will also accept neatly printed answers (i.e. not typed) with similar formatting.
5. Writing Assignment I is **due at the beginning of class on 19 October 2018**. You must turn in a hardcopy of your assignment. You are <u>not</u> permitted to email or submit electronic copies of this assignment. You will be docked one letter grade per day that your assignment is late.

Part One – Definition (Maximum Length = ½ Page; Total = 6 pts)

Select <u>one</u> term below and write a short definition of that term in the context of this course (2 pts). Give an example where this term is used in a real world application (4 pts).

i) White Noise
ii) Elasticity
iii) Sound Shadow

Part Two – Short Answer (Maximum Length = 1½ Pages; Total = 20 pts)

Select **one** question below and write a short answer for it. You are expected to consult information sources outside of lecture and your textbook. Be sure to provide a complete and proper citation for any references you cite. BE SURE TO SHOW YOUR WORK. YOU <u>MAY USE</u> A CALCULATOR.

i) (a) What is the Doppler effect (4 pts)?

(b) Describe a real world application of the Doppler effect relevant to acoustics (4 pts).

(c) Find and interpret an equation that allows you to calculate the amount of Doppler shift (6 pts).

(d) Consider this scenario. A carousel (diameter = 10.91 m), rotating at 0.572 radians/second, carries a passenger who is blowing a whistle that emits a frequency of 5400 Hz. The passenger is sitting on a seat on the outer edge of the carousel. What is the lowest (2 pts), highest (2 pts), and mean frequency (2 pts) heard by an observer <u>not</u> on the carousel? (6 pts total).

ii) (a) What is echolocation or biosonar (2 pts)? Briefly differentiate between active echolocation *versus* passive listening (2 pts).

(b) You are an engineer building a robotic bat to explore an intergalactic planet with a known atmosphere. List 4 factors that you would need to take into account for your robot to navigate in its environment using echolocation (4 pts)?

(c) Describe 4 features of an object that can be inferred with echolocation. For each feature describe how acoustic properties of the echo allow for inference of object properties (4 pts).

(d) Define and describe a role for the following acoustic features in echolocation: (1) bandwidth, (2) amplitude, (3) interpulse interval, and (4) duration (2 pts each; 8 pts total).