

SPPA 2040: Phonetics
Study Guide for Exam 2 (physical acoustics material only)

Notes: This study guide is intended to give you a general idea of some of the topics that might be covered on the exam, and to help you organize your studying. *It is not intended to cover all of the topics that might appear on the exam. It is not intended as a substitute for studying the readings and your lecture notes.* The exam will consist primarily of short answer, fill-in-the-blank, multiple-choice questions, matching, drawing and identifying pictures, and very short essays (e.g., 1-3 sentence explanations).

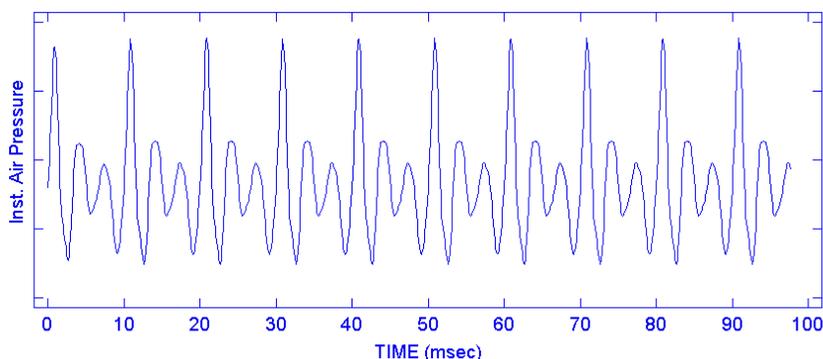
1. Draw time- and frequency-domain representations of simple periodic, complex periodic, and (long-ish) complex aperiodic (noise) sounds.
2. Draw time- and frequency-domain representations of two complex periodic sounds with different fundamental frequencies.
3. Draw time-domain representations of two simple periodic sounds with the same frequency and different amplitudes.
4. Draw amplitude spectra of two sounds with the same fundamental frequencies but different spectrum envelopes.
5. Draw amplitude spectra of two sounds with different fundamental frequencies but similar spectrum envelopes.
6. Calculate signal frequencies for sinusoids with the following values:
 - a. period = 0.34 s (seconds)
 - b. period = 2 s
 - c. period = 10 ms (milliseconds)
 - d. period = 2 ms
 - e. period = 12 ms
 - f. period = 7 ms

Answers:

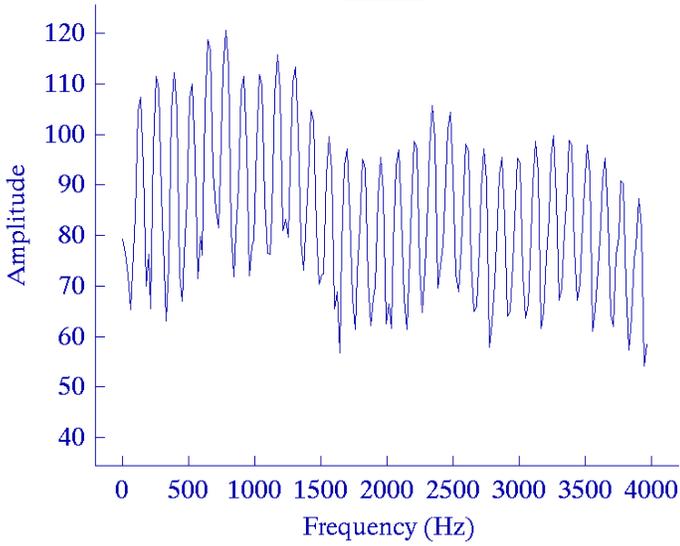
- a. $f = 1/0.34 = 2.94$ Hz
- b. $f = 1/2 = 0.5$ Hz
- c. $f = 1/0.01 = 100$ Hz
- d. $f = 1/0.002 = 500$ Hz
- e. $f = 1/0.012 = 83.333$ Hz
- f. $f = 1/0.007 = 142.86$ Hz

7. A complex periodic signal has a fundamental period of 4 msec. What is the fundamental frequency of the signal? At what frequency/frequencies would we expect to find energy?
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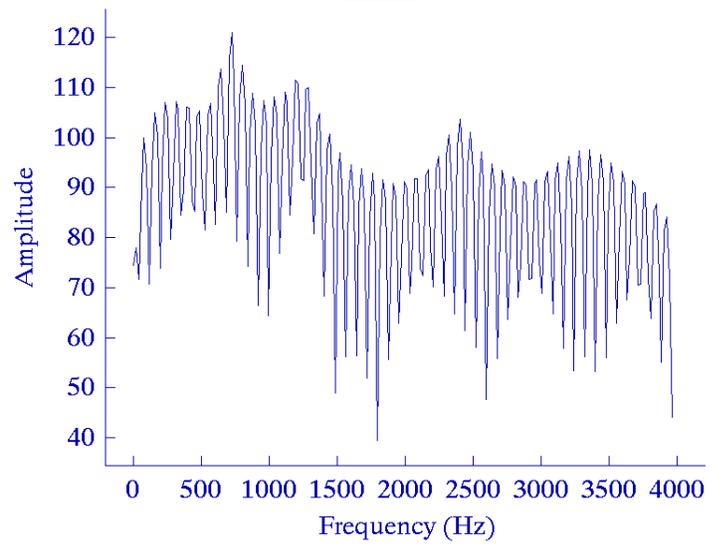
8. Give examples of the following kinds of graphs, being sure to label both axes:
- amplitude spectrum
 - frequency-response curve
 - time-domain representation
9. Draw and label frequency-response curves for low-pass, high-pass, and band-pass filters.
10. How, if at all, are the terms *resonant frequency* and *harmonic* different?
11. How, if at all, are the terms *resonant frequency* and *formant* different?
12. A harmonic is a peak in: (a) a frequency response curve, (b) an amplitude spectrum, or (c) either a frequency response curve or an amplitude spectrum.
13. A resonance is a peak in: (a) a frequency response curve, (b) an amplitude spectrum, or (c) either a frequency response curve or an amplitude spectrum.
14. A formant is a peak in: (a) a frequency response curve, (b) an amplitude spectrum, or (c) either a frequency response curve or an amplitude spectrum.
15. A frequency response curve describes a (circle one): sound/filter.
16. An amplitude spectrum describes a (circle one): sound/filter.
17. For the figures on pages 4-5:
- spectrum A goes with (circle one): C or D
 - which is higher in F_0 (circle one): A or B
 - which is higher in F_0 (circle one): C or D
 - The spectrum of E could be (circle one): A B C D or F
- 18.
- What is the fundamental period of the signal below? _____
 - What is the fundamental frequency of the signal below? _____
 - What type of signal is this (e.g., simple aperiodic, etc.)? _____
 - The spectrum of this signal (below ~500 Hz only) would show energy at these frequencies _____



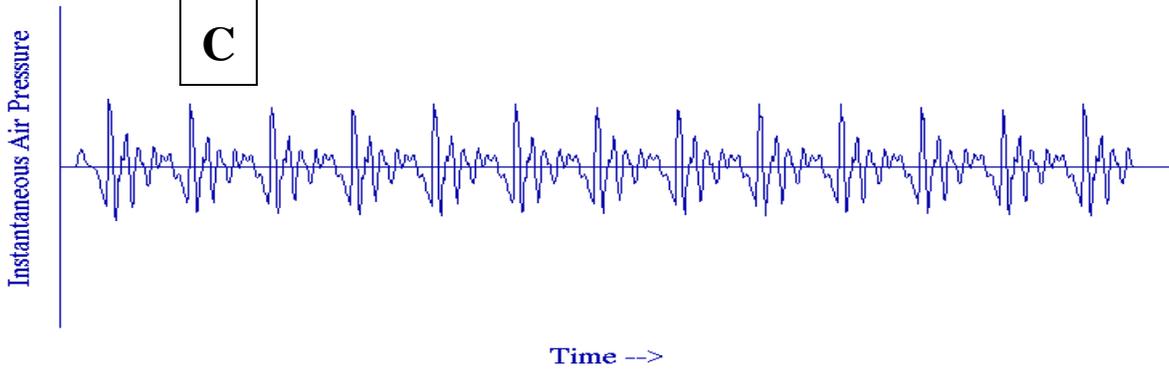
A



B



C



D

