K503 Super All-inclusive Final Exam Review Sheet
Coaches Hass and Gibson

1. Format of the exam:
   - 10 brief, but complete and accurate identifications from MIDI and analog synthesis (example: Q, for which you would list the general definition and the formula (found in the web filters page))
   - Three questions requesting information and diagrams (example: Describe the four simple waveforms provided on most analog synthesizers and the harmonic spectrum of each. Be sure to indicate the relative strength of the partials and be specific about the form with a variable phase width—so you would draw a waveform like a triangle wave, say it only had odd # partials which decrease exponentially in strength 1/p#^2). You would also include a longer definition of the pulse wave’s spectrum as described on the Synthesis Waveform page—and you would of course list PULSE WAVE, and not SQUARE WAVE (which is only one type of pulse wave with a 1:2 duty cycle).
   - One long essay on a complete overview of the MIDI system, with some prompts in the question

2. Topics for study: All the etext reading on MIDI and analog synthesis.

3. For the MIDI essay, know everything on pages 1-5 of my MIDI chapter EXCEPT you don’t need to know specific MIDI binary codes, but you do need to know the verbal description of them. So for example, if I asked you to describe the MIDI codes for turning a note on, you would answer: status byte (note on action + MIDI channel), data byte (key #), data byte (velocity 1-127). Know the four specific controller numbers on Page 5, know the transmission rate, that it is serial or asynchronous (one bit after another rather than 8 or 10 bits at a time in parallel). Know all terms you see, including running status and OMNI mode. Know the code classes on Page 3 and briefly what each does. Be able to diagram a typical MIDI set-up (see Page 2 of the MIDI chapter).

4. For analog synthesis:
   - as the above example lists, be able to list the four basic waveforms and provide specific information about their spectra (spectrums, what partials are sounding and what is their relative strength)
   - be able to diagram the basic patch and label the modules (VCO, VCF, VCA, EG, etc.) and each connections as signal or control or gate (S or C or G)
   - be able to diagram the four basis filter types listed in the webpages, with cutoff frequency (half-power point or -3 dB) or frequencies, know the terminology, such as cut-off point, passband, poles and zeroes, Q (or resonance) and its formula.
   - terms such as subtractive synthesis, additive synthesis, offset and attenuator*, half-power point (filters), formants (areas of resonance), tremolo (low-frequency amplitude modulation), vibrato (low-frequency frequency modulation), LFO (low-frequency oscillator), VCO, VCF, VCA, envelope generator (attack, decay, sustain, release), c.o.f. (cut-off frequency-filters), duty cycle (waveforms).
• for those who missed it, here are the simple defs for offset and attenuator
  o **offset**: sets the *initial setting* of a module, such as the initial frequency of a VCO, the initial cutoff frequency of a VCF or the initial amplitude of a VCA
  o **attenuator**: cuts down on the effect of applied control voltage, so for example, a filter won’t sweep as wide a frequency range when an envelope generator is applied to it