**Applied Acoustics - 06/11/2015 In-class test - Lecturer: Angelo Farina**

Note: some input date are based on the 6 digits of Matricula number, assigned to the 6 letters A B C D E F.

If for example the matricula is 123456, it means that A=1, B=2, C=3, etc. . Furthermore CD=34 (NOT 3x4).

Top of Form

**Surname and Name**

F

E

D

C

B

A

**Matricula**

**What is the theoretical dynamic range of a recording with 20 bit resolution? (**one answer only)

* 72 dB
* 96 dB
* 110 dB
* 120 dB
* 140 dB

**The signal is sampled at 48 kHz and is analysed with FFT blocks of 4096 samples, with a 75% overlap. Approximately, how many spectra are obtained each second?**

* 4 **(**one answer only)
* 12
* 23
* 47
* 94

**And what is the bandwidth of each spectral line?**

***(****write number and measurement unit)*

**How many of these spectral lines are included in the 1/3 octave band centered at 2 kHz?**

*(write number and measurement unit)*

**What are the benefit of employing firecrackers instead of other impulsive sources (such as balloons, pistols, clapping machine, loudspeaker, etc.) ? (**multiple answers)

* Low cost
* Perfectly flat spectrum
* Highly reproducible
* Large acoustical power
* Omnidirectional

**What are the benefit of the exponential sine sweep test signal in comparison with other signals (such as white or pink noise, MLS or IRS signal, linear sine sweep) ? (**multiple answers)

* Perfectly flat (white) spectrum
* Pink spectrum, so better S/N ratio at low frequency
* Immunity to nonlinearities
* Immunity to time variance
* Immunity to impulsive noises during the measurement

**An linear sine sweep is convolved with the time reversal of itself. What will be the spectral slope of the resulting signal, as shown by an FFT analysis? (**one answer only)

* Flat (white)
* -3 dB/octave (pink)
* -6 dB/octave (brown)
* -9 dB/octave
* -12 dB/octave

**What's the purpose of the window to be applied before the FFT operation? (**one answer only)

* For avoiding aliasing
* For avoiding spectral leakage
* For smoothing the spectrum
* For ensuring that the spectral peaks are not too narrow
* For removing the DC offset

**How many seconds of recording can be stored on an Audio-CD, if its capacity is 700+EF Mbytes?  
(***write number and measurement unit)*

**The recording of a music piece is long 30+E s. The recording is convolved with the impulse response of a church, which is 5+F s long. Compute the length of the convolved signal in samples (at 48 kHz)**

*(write number and measurement unit)*