**Applied Acoustics - 19/12/2014 In-class test - Lecturer: Angelo Farina**

Note: some input data 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 EF=56 (NOT 5x6).

**Warning: On-line compilation of this form warrants TWO additional score points.**

Top of Form

**Surname and Name   
+ signature**

F

E

D

C

B

A

**Matricula**

1) - DISIA - A train passage was recorded, with a total duration of 70+F s and an Leq = 65+E dB(A). The train was long 100+D\*20 m. Compute the value of the Normalized SEL to be stored in the DISIA database

*Write number and measurement unit*

2) - DISIA - The traffic during the day period along a road (no slope and normal pavement) is the following: (10+F)\*1000 cars, (10+E)\*3000 heavy trucks, (10+D)\*100 motorcycles. The SEL values are 80+A, 85+B and 90+D dB(A) respectively. Compute Leq,7.5m.

*Write number and measurement unit*

3) - RAMSETE - Compute the critical time tc for a pyramid tracing simulation inside a room having a volume V=500+EF m³, a surface S=400+D\*10 m², launching 8192 pyramids with the standard value of β=0.1

*Write number and measurement unit*

4) RAMSETE - Compute the number of pyramids being launched when the subdivision level is set to 5+F

*Write number*

5) Compute the total SPL in dB(A) of a white spectrum in octave bands ranging between 31 Hz (where the SPL is 60+F dB) and 16 kHz (10 octave bands)

*Write number and measurement unit*

6) Compute the value of Leq at the end of a measurement, during which the SPL was 60+F dB(A) for 1+D hours and 65+E dB(A) for 2+C/3 hours

*Write number and measurement unit*

7) Compute the SPL inside a room having a volume V=300+D\*20 m³, a reverberation time of 1+F/10s, where a point source is located in a corner, with an Lw=90+E dB, and the receiver is at the critical distance.

*Write number and measurement unit*

8) Compute the sound reduction in dB caused by a noise screen having an effective height of 3+F/10 m, placed at the center point between source and receiver, which are distant 10+E m. The sound has a dominant frequency of 100\*(1+D) Hz.

*Write number and measurement unit*

9) Compute the value of Clarity C80 in a simplified case where the direct sound has an SPL=80+F dB and the reverberant sound (which starts after 80 ms) has an SPL=80+E dB

*Write number and measurement unit*

10) The anechoic impulse response of a loudspeaker is measured, and a numerical inverse FIR filter is computed, having a length of 2^(5+F) samples at Fsamp=48 kHz. The main peak of the inverse filter is in the middle. How much latency (in ms) is caused by the usage of this digital filter employing a zero-latency DSP processor?

*Write number and measurement unit*