**Applied Acoustics - 07/12/2018 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) Compute the value of LA,eq at the end of a measurement, during which the SPL was 60+F dB(A) for 1+D hours, 65+E dB(A) for 2+C/3 hours and 63+D dB(A) for 3h.

2) The traffic along a road, during the day period (06-22), is of 10000+E·1000 cars. The SEL of a single car pass-by is equal to 80+F dB(A) at the standard distance of 7.5m. Compute LA,eq,day at a distance of 40+E m.

*write number and measurement unit (with a space in between and no other spaces)*

3) Compute the value of Lep for a worker spending a daily period of 8+F/2 h inside a factory where the background noise level is 75+E dB(A) and subject to 50+D\*10 events having a SEL of 100+F dB)(A) each.

*write number and measurement unit (with a space in between and no other spaces)*

4) Compute the total SPL in dB(A) of a white spectrum in octave bands ranging between 31.5 Hz and 16 kHz (10 octave bands). The SPL in the 1 kHz octave band is 60+F dB.

*write number and measurement unit (with a space in between and no other spaces)*

5) Recompute the total SPL in dB(A) in the same case of previous exercise, after having installed a barrier between the point source and the receiver causing a path increment δ=1+F/10 m.

*write number and measurement unit (with a space in between and no other spaces)*

6) What is the correct definition of Lep?

*(a single answer)*

* The equivalent level averaged over a period of 8 hours
* The equivalent level averaged over a period of 16 hours (day)
* The equivalent level averaged over the effective duration of the daily work
* The equivalent level averaged over the effective duration of the daily work, T, packed to 8 hours adding +10\*log10(T/8h)
* Lep is the same as the Single Event Level (SEL)
* Lep, followed by a number, is the Percentile level: Lep10, Lep50, Lep90, etc.

7) What is the correct definition of differential noise limit according to Italian law?

*(a single answer)*

* The difference between Leq,day and Leq,night
* The difference between the SPL generated by a sound source and the background noise level
* The difference between the total environmental noise level and the residual noise level (which means LA,eq with a specific sound source switched off), both measured on short times (a few minutes).
* The difference between the SPL generated by a specific sound source and the residual level measured with that specific sound source turned off.
* The difference between the SPL outside (at 1m from the closed window) and the SPL inside the room .

8) What is the relationship between the average sound pressure Lp measured inside a silent room, on a parallelepiped surface S surrounding a sound source and the power level Lw of the sound source?

*(a single answer)*

* Lw = Lp + 11 + 20\*log10(r)
* Lw = Lp + 11 + 20\*log10(r) - 10\*log10(Q)
* Lw = Lp - 10\*log10[Q/(4\*π\*r²)+4/A]
* Lw = Lp + 10\*log10(S)
* Lw = Lp + 10\*log10(S)-K2, where K2 = 10\*log10(1+4\*S/A)