**Applied Acoustics - 06/12/2019 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**

F

E

D

C

B

A

**Matricula signature**

**1) What is the difference between Sound Reduction Index R and Sound Insulation D?**

*(a single answer)*

* There is no difference: they are the same thing
* R is measured in the lab, D is measured “in situ”
* R is preferred, as it is always slightly larger than D
* The quantities are related by the formula D = L1-L2 = R + 10\*log10(A2/S)
* D is the “single number” rating of R, obtained positioning the ISO-717 reference curve
* D is simply the level difference between two adjacent rooms, while R has a correction for the reverberation time of the receiving room: R = D + 10\*log10(T/T0), where T0 = 0.5 s.

**2) What is required for applying the tonal correction penalty to measurements performed according to Italian law?**

*(a single answer)*

* The value of Leq in one 1/3 octave band must exceed the adjacent ones by at least 5 dB
* The value of Lmin,fast in one 1/3 octave band must exceed the adjacent ones by at least 5 dB
* The level of the 1/3 band of previous clause must hit the loudest isophonic curve on ISO 226 chart.
* The presence of a pure tone must be persistent, continuous and clearly audible
* The three previous clauses must be verified simultaneously for applying the tonal correction penalty

**3) What is the relationship between the average sound pressure Lp measured inside a perfectly reverberant room 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[A/4]
* Lw = Lp + 10\*log10(S)
* Lw = Lp + 10\*log10(S)-K2, where K2 = 10\*log10(1+4\*S/A)

**4) Compute the value of LA,eq,day at the end of a measurement from 06 to 22, during which the SPL was fluctuating around 60+F dB(A) for all the time, except for a short period of 1+E/10 hours, during which the SPL was 70+D dB(A).**

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

**5) For measuring the absorption coefficient α of an absorbing material, a sample of 8+F/4 m² is placed inside a reverberant room, having a volume V=200+DE m³. This causes the reverberation time to drop from 6+E/10 s to 4+D/10s.**

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

**6) 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 there are 1+D short periods of 10 minutes each, during which the SPL is 83+F/4 dB(A).**

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

**7) Compute the total SPL in dB(A) of a pink spectrum in octave bands ranging between 63 Hz and 8 kHz (8 octave bands). The SPL in each octave band is 70+F dB.**

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

**8) Recompute the total SPL in dB(A) in the same case of previous exercise, after having installed a box around the source, made of panels weighting 70+E\*3 kg/m².**

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