**Applied Acoustics - 11/10/2021 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 you do not have yet a matricula number use your date of birth: DDMMYY.

If for example the matricula is 123456, it means that A=1, B=2, C=3, etc. .

Furthermore CD=34 (NOT 3x4), DE =45, EF =56.

Top of Form

**Surname and Name**

F

E

D

C

B

A

**Matricula**

**Check the sentences you think are always TRUE**  (multiple answers allowed)

* The energy density level is always larger than the sound intensity level: LD>LI
* The values of the levels in dB of sound pressure, particle velocity, sound intensity and sound energy density are always the same: Lp=Lv=LI=LD
* A value of the ratio I/Dc close to 0 means the sound field is strongly reverberant/reactive
* A value of the ratio I/Dc close to 1 means the sound field is strongly reverberant/reactive
* The sound speed in air is invariant (340 m/s)
* The sound speed in air is variable, being proportional to the temperature
* The sound speed in air is variable, proportional to the square root of temperature

**The power of a source is quadruplicated. What effect do you expect?**  (multiple answers allowed)

* The sound power level of the source increases by 3 dB
* The sound power level of the source increases by 6 dB
* The sound power level of the source increases by 10 dB
* The sound pressure level at the receiver increases by 3 dB
* The sound pressure level at the receiver increases by 6 dB
* The sound pressure level at the receiver increases by 10 dB

**What is the bandwidth (fhi-flo) of the octave band filter centered at 4 kHz?** (a single answer)

* 717 Hz
* 1000 Hz
* 1414 Hz
* 2000 Hz
* 2828 Hz
* 4000 Hz

**What's the sound pressure corresponding to a SPL = 110+F dB ?** (write number and measurement unit)

**What’s the particle velocity level corresponding to v= 0.1+E/10 mm/s?** (write number and measurement unit)

**Compute the coherent sum of the sound pressure levels**

**of 80+E and 80+D dB produced by two phase-matched sources**  (write number and measurement unit)

**The unweighted octave-band spectrum of a fan is given here below.**

**Compute the SPL in dB(A)**  (write number and measurement unit)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 125 Hz | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz | Total - dB(A) |
| 80+A | 75+B | 73+C | 70+D | 70+E | 70+F |  |

**The background noise in a room is 50+F dB(A). A sound source is switched on, and the total SPL increases by 2+E/5 dB(A). Compute the SPL of the second source alone.** (write number and measurement unit)