**Applied Acoustics - 27/10/2017 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), DE =45, EF =56.

**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**

**Given that at the distance r from a point source in free field you have an SPL=80 dB, at which distance do you get an SPL =70 dB ?**  (one answer only)

* 2 \* r
* 3.16 \* r
* 4 \* r
* 5 \* r
* 10 \* r

**Given that at the distance r from a line source in free field you have an SPL=80 dB, at which distance do you get an SPL =70 dB ?**  (one answer only)

* 2 \* r
* 3.16 \* r
* 4 \* r
* 5 \* r
* 10 \* r

**The effect of wind :**  (multiple answers allowed)

* depends on the wind speed
* depends on the vertical gradient of wind speed
* depends on the temperature of air
* depends on the humidity of air
* boosts the SPL downwind
* can cause a shadow zone upwind

**What happens in the far field of a point source (kr >>1) ?** (multiple answers allowed)

* Both sound pressure and particle velocity decrease as 1/r
* Sound pressure decreases as 1/r, particle velocity decreases as 1/r²
* Both sound pressure and particle velocity decrease as 1/r²
* Sound pressure and particle velocity get out of phase
* The acoustic impedance tends to zero
* The acoustic impedance tends to ρ\*c

**A point source radiates in free field with a power of 1+F/10 W, and a directivity factor Q=1+E/4. Compute the value of SPL at a distance of 10+D meters.**

(write number and measurement unit)

**The traffic along a road is 1000+EF\*10 vehicles/h, with a speed of 50+CD km/h. Compute the average A-weighted sound power level of a single vehicle knowing that the SPL at a distance of 50+F meters is equal to 60+E dB(A).** (write number and measurement unit)

**The long-term averaged spectrum of noise is as follows: 80+F dB at 125 Hz, 75+E dB at 250 Hz, 80+D dB at 500 Hz, 82+C dB at 1 kHz, 84+B dB at 2 kHz, 80+A dB at 4 kHz. Compute the total SPL in dB (unweighted)**

(write number and measurement unit)

**In the case of previous exercise, re-compute the total SPL in dB(A) (A-weighted)**

(write number and measurement unit)