**Applied Acoustics - 23/10/2015 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.

Top of Form

**Surname and Name**

F

E

D

C

B

A

**Matricula**

**The SPL at 15 m from a point source is 80 dB. At which distance you find an SPL=74 dB ?** (one answer only)

* 20 m
* 30 m
* 40 m
* 50 m
* 60 m

**The SPL at 15 m from a line source is 80 dB. At which distance you find an SPL=74 dB ?**  (one answer only)

* 20 m
* 30 m
* 40 m
* 50 m
* 60 m

**The effect of wind increases the SPL downwind and attenuates it upwind for this reason :**

(multiple answers allowed)

* The speed of wind sums with speed of sound downstream, and subtracts from it upstream
* The vertical gradient of speed causes the sound rays to curve downward downstream, and upward upstream
* The wind cools the ground, causing a vertical temperature gradient, which curves the sound rays
* The wind “carries” the sound, exactly the same phenomenon of convective heat transfer
* It is a psychoacoustics effect, in reality the SPL is the same upstream and downwind

**What’s the cause of the proximity effect over a cardioid microphone** (multiple answers allowed)

* The air emitted from the mouth causes noise due to turbulence on the microphone grid
* Sound pressure increases as 1/r, particle velocity increases as 1/r², so at short distance and low frequency the velocity level becomes much larger than the pressure level
* It depends on the fact that a cardioid microphone is partially sensitive to sound pressure, and partially sensitive to particle velocity (half and half)
* It is due to the fact that when kr<<1 sound pressure and particle velocity get out of phase
* It is due to the fact that when kr<<1 the acoustic impedance tends to zero
* It is due to the fact that when kr<<1 the acoustic impedance tends to infinity

**A point source placed over a reflective plane radiates in free field with a power of 1+F/10 W. Compute the value of SPL at a distance of 10+D meters.**  (write number and measurement unit)

**A photo shows that the avreage distance between centers of vehicles running along a road is 80+10\*E m. If the sound power level of a single vehicle is 100 dB(A), what's the SPL at a distance of 50+F meters?**

(write number and measurement unit)

**At 15m from a point source, 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(A)**

(write number and measurement unit)

**In the case of previous exercise, re-compute the total SPL in dB(A) after inserting a noise barrier at 5m from the source with an effective height of 3+F/5 m**  (write number and measurement unit)