**Applied Acoustics - 09/10/2023 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 Signature**

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

* In a free spherical sound field the SPL decreases by 3 dB at each doubling of the source-receiver distance
* In a free spherical sound field the SPL decreases by 6 dB at each doubling of the source-receiver distance
* In a free cylindrical sound field the SPL decreases by 3 dB at each doubling of the source-receiver distance
* In a free cylindrical sound field the SPL decreases by 6 dB at each doubling of the source-receiver distance
* When the traffic flow along a road doubles, the SPL at the receiver increases by 3 dB
* When the traffic flow along a road doubles, the SPL at the receiver increases by 6 dB
* When the speed of vehicles doubles, with constant power level, the SPL at the receiver increases by 3 dB
* When the speed of vehicles doubles, with constant power level, the SPL at the receiver decreases by 3 dB

1. **Check only the CORRECT definitions**  (multiple answers allowed)

* The reflection coefficient of a wall r is the ratio between reflected power and incident power
* The absorption coefficient of a wall a is the ratio between absorbed power and incident power
* The apparent sound absorption coeff. of a wall α is the ratio between absorbed power and incident power
* The apparent sound absorption coeff. of a wall α is the sum of the absorption and transmission coefficients (α=a+t), which also means 1-r
* The transmission coefficient of a wall t is the ratio between power transmitted through the wall and incident power
* The sum of α + t is always equal to 1 (α+t=1)

1. **The reverberation time in a room is reduced from 4 s to 1 s thanks to installation of absorbing panels under the ceiling. What is the reduction of the SPL of the reverberant field?** (a single answer)

* 0 dB
* 3 dB
* 6 dB
* 10 dB
* 20 dB

1. **Compute the SPL generated by an omnidirectional point source with a power level Lw=100+F dB at a receiver located at a distance of 50+E m, in free field** (write number and measurement unit)

1. **Repeat the calculation when the source is placed over a reflecting plane**

(write number and measurement unit)

1. **Compute the SPL produced by a road with a traffic flow of 2000+F\*100 vehicles/h, with a power level of each vehicle of 85+E dB(A) and at a receiver located at 50+D\*5 m from the road axis**  (write number and measurement unit)

1. **Compute the reverberation time in a room having a volume of 300+F\*20 m³, and an equivalent absorption area A=α·S= 50+E m²** (write number and measurement unit)

1. **Compute the critical distance in the previous exercise, knowing the directivity of the sound source   
   Q = 3+F/2** (write number and measurement unit)