**Applied Acoustics - 28/11/2022 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.



**Surname and Name**



**Matricula signature**

1. **Check the sentences you think are always TRUE**

*multiple answers allowed: for each answer, 1 point if correct, -1 point if wrong, 0 point if "not selected"*

* In Italian law, absolute noise level limits are 70 dB(A) day and 60 dB(A) night
* In Italian law, absolute noise level limits are set by the municipality depending on the destination of each area (residential, industrial, etc.)
* In Italian law, absolute noise limits are to be verified outdoors
* In Italian law, absolute noise level limits are to be verified indoors
* In Italian law, differential noise limits are to be verified only outdoors
* In Italian law, differential noise limits are to be verified only indoors

**2) Check the acoustical parameters which are subjected to the Italian law on building acoustics**

*multiple answers allowed: for each answer, 1 point if correct, -1 point if wrong, 0 point if "not selected"*

* The facade sound insulation index D,2m,nT,w
* The apparent sound reduction index of windows and facades R'w,
* The apparent sound reduction index R'w of internal horizontal partitions
* The apparent sound reduction index R'w of internal vertical partitions
* The level of tapping noise normalised to the reverberation time L'n,T,w
* The level of tapping noise normalised to the absorption area L'n,w

**3) Why can the Sabine's absorption coefficient be greater than 1 when measured according to ISO 354?**

*Only one answer allowed, 1 point if correct, -1 if wrong, 0 if no answer*

* Because of the errors during measurements
* Because the Sabine's formula works correctly only when the absorption is evenly distributed over all the surfaces
* Because the test room is too small
* Because the sample of material being tested is too small
* Because the formula employed in the standard is approximate, as it does not take into account that the sample of material being tested cover a portion of the room's internal surface
* None of the above

**4) During the day period the background noise level is 60+F dB(A). A number N= 100+D\*10 aircrafts are passing, each causing, on average, a SEL = 90+E dB(A).
Compute, La,eq,day.**

(write number and measurement unit)

 **5) A worker spends his morning shift of 4 hours in a factory with a background noise level of 70+E dB(A). Then he spends one hour in the cafeteria of the factory, with a noise level of 80+D dB(A). Finally, he spends two hours working outdoors, with a noise level of 75+F dB(A). Compute his daily personal exposure level Lep.** 

(write number and measurement unit)

 **6) Inside the factory of the previous exercise a new machine is added which punches metal sheets. Each punch produces a SEL of 85+F dB(A) and during the morning shift a number N=130+E punches are done. This punching noise adds to the noise already present. Compute the new value of Lep for the worker of the previous exercise.**

(write number and measurement unit)

 **7) Evaluate the absorption coefficient of a noise barrier installed along a road, knowing that a sound intensity probe installed in front of it measures the following levels:
Li = 70+F dB(A) Lp = Li+5 dB(A) Lv = Li + 2 dB(A)**

 (write number and measurement unit)

**8) The absorption of 12 seats is measured in a reverberant room having a volume of 200+E\*10 m3. The values of Te (empty) is 8+F/10 s, the value of Ts (with the seats) is 3+D/10 s. Compute the equivalent absorption area A of one seat.**

(write number and measurement unit)