**Applied Acoustics – Test 3/2020 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.

If L =100+E\*10 the results is 100+(5\*10) = 150 (the product has precedence over the addition).

Top of Form

**Surname and Name**

F

E

D

C

B

A

**Matricula**

1. **What is the definition of the Sound Reduction Index R?**

*one answer only: 1 point if correct, -1 point if wrong, 0 point if "no answer"*

* It is the reduction of SPL caused by a wall, that is the difference between the SPL at the two sides of it
* It is the "insertion loss", given by the difference of the SPL at the receiver before and after installing the wall
* It is given by -10\*log10(t), where t is the transmission coefficient of the wall
* It is the ratio between the sound intensity passing through a wall and the sound intensity impinging over the wall
* It is the difference between the sound power level of the source and the sound pressure level behind the wall
* I do not know (no answer)

**2) What is the effect of adding absorption to the receiving room on the value of the sound reduction index R of the partition?**

*one answer only: 1 point if correct, -1 point if wrong, 0 point if "no answer"*

* R increases, as the absorption causes a reduction of the SPL in the receiving room
* R decreases, as in the formula for computing R the absorption area of the receiving room is at the denominator
* R does not change, as it only depends on the partition, and not on the acoustical properties of the two rooms
* R usually changes, but it is impossible to know if it will increase or decrease
* It depends on where the additional absorption is located: R increases if it is on the partition, R decreases if it is elsewhere
* I do not know (no answer)

**3) Which of the following acoustical parameters can be used for qualifying the acoustical quality of a room used for conferences and lessons?**

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

* Clarity C80
* Clarity C50
* IACC (inter-aural cross-correlation)
* Jlf (lateral fraction)
* STI
* Reverberation Time T20

**4) Which of the following materials provide good sound absorption?**

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

* closed-cell polystirene panels
* open-cell polyurethane foam
* polyesters fiber panels
* concrete slabs
* brick wall, plastered
* thick carpet

**5) A plane wave having a sound intensity level of 80+F dB impinges over a large, planar surface having an absorption coefficient α=0.4+E/40. Compute the sound intensity level of the reflected plane wave.**

*write number and measurement unit*

**6) A plane wave having a sound intensity level of 80+F dB at the frequency of 400+D\*100 Hz impinges over a wall made of concrete (ρ=2000+E\*50 kg/m³), having a thickness of 10+F cm. Compute the sound intensity level of the plane wave which passes through the wall.**

*write number and measurement unit*

**7) In a laboratory for measuring the sound insulation of partitions, the following data are measured: L1 = 80+F dB (source room), L2 =30+E dB (receiving room). The partition has a surface S = 10+D/5 m², and the receiving room has an absorption area A = 5+E/2 m². Compute the value of R.**

*write number and measurement unit*

**8) A tapping machine is operated inside a multi-store building. In the receiving room the SPL is 60+F dB, and the reverberation time is 1+E/10 s. Compute the value of the normalized tapping level Ln according to the UNI 8270-4 standard.**

*write number and measurement unit*