# **Applied Acoustics – 29 January 2016**

Name & Surname:

E

D

C

B

A

F

Matricula:

**Exercise 1 (tolerance +/- 5%)**

Inside a classroom the reverberation time T20 is measured, and it is equal to 2+F/10 s. The volume of the room is 100+D·10 m3. How many sound absorbing panels must be inserted in the room for reducing the reverberation time just below 1.0 s, if each panel has an equivalent absorption area of 0.5+E/10 m2?

Compute also the average absorption coefficient **** before and after the introduction of the panels, knowing that the internal surface of the room S is equal to 100+F·10 m2 and that the surface of each sound absorbing panel is exactly 1.0 m2.

* Number of Panels (4 points)
* ****i (initial) (3 points)
* ****f (final) (3 points)

**Exercise 2 (tolerance +/- 0.5 dB)**

An omnidirectional point source, radiating wide-band incoherent noise, is located at an height of 5+E/4 m above the ground covered by grass (α=0.3+F/30). The Sound Power Level Lw is equal to 100+D dB.

A microphone is located exactly below the source, and at an height of 3+C/10 m above the ground.

Determine the following values of the SPL at the microphone.

* SPL of Direct Sound dB (3 points)
* SPL of Reflected Sound dB (4 points)
* Total SPL (direct + reflected) dB (3 points)

**Exercise 3 (tolerance +/- 0.5 dB)**

Two rooms are separated by a wall having a surface **S**=10+E/20 m2 and an areic mass **** of 100+F·20 kg/m2. Compute the value of the sound reduction index of the wall, R, at the frequency **f** of 1000 Hz.

The receiving room has a volume of 60+D·4 m3, and a reverberation time of 2+C/10 s (the same at every frequency). Compute the maximum SPL allowed in the source room for ensuring that in the receiver room the value of SPL does not exceed 40 dB, both at 1000 Hz and at 100 Hz.

* R(1000Hz) dB (3 points)
* Max SPL source room (1000 Hz) dB (3 points)
* Max SPL source room (100 Hz) dB (4 points)