# **Applied Acoustics – 23 June 2017**

Name & Surname:

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Matricula:

**Exercise 1 (tolerance +/- 0.05, 0.5 dB)**

A plane wave impinges orthogonally against a planar surface, having an impedance which is 2+F/10 times the air impedance. Compute the apparent sound absorption coefficient  of the surface and the reflection loss in dB (attenuation of the reflected wave compared to the incident wave).

* Absorption Coefficient  (5 points)
* Reflected Sound SPL reduction dB (5 points)

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

An omnidirectional point source, radiating incoherent noise, is located inside a room, having dimension of m (6+F)x(4+E)x(2+D/2) and with an average value of the absorption coefficient α=0.3+F/50. The Sound Power Level Lw is equal to 100+D dB.

A microphone is located at a distance of 3+E/2 m.

Determine the following values of the SPL at the microphone.

* Direct Sound SPL dB (5 points)
* Reverberant Sound SPL dB (5 points)
* Total SPL dB (5 points)

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

A sound source radiates a dominant pure tone at a frequency of 120 Hz. For attenuating it, a secondary source is used for Active Noise Cancellation. At the listening point, the first source produces an SPL of 80+F dB, and the secondary source produces 2 dB less. The secondary source is perfectly phase reversed with respect to the first source. Compute the value of SPL when also the secondary source is active.

* Total SPL dB (5 points)