# **­Applied Acoustics – 01 April 2016**

Name & Surname:

E

D

C

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A

F

Matricula:

**Exercise 1 (tolerance +/- 1 dBA)**

A straight pipe, 40 m long, is suspended in air outdoors, and is transporting steam at high pressure, radiating noise caused by the turbulent flow inside. At a distance of 1.0 m from the center of the pipe the SPL is equal to 80+F dB(A). Compute the SPL at a distance of 5+E m, in free field. Recompute the SPL at a distance of 5+E m in the case the pipe is enclosed inside a large building, having a volume of 3000 m3 and a reverberation time of 3+E/10 s.

* SPL at 5+E m distance, free field dB(A) (4 points)
* Power level radiated by pipe Lw dB(A) (3 points)
* SPL at 5+E m distance, indoors dB(A) (3 points)

**Exercise 2 (tolerance +/- 1 dB)**

A sample of unknown absorption coefficient is placed at the end of a standing wave tube. At the opposite end, a loudspeaker generates a pure tone at 1000 Hz. A sound intensity probe measures the following values: LI = 78+F/10 dB, LD=81+E/10 dB. Compute the following unknown quantities:

* Absorption coeff. of the sample  dB (4 points)
* SPL, max dB (3 points)
* SPL, min dB (3 points)

**Exercise 3 (tolerance +/- 1 dB)**

Two rooms are separated by a wall having a surface **S**=10+E/20 m2 and a total mass of 2000 kg.

In the source room, a fan produces a pink noise (flat) spectrum, having a value of SPL = 80+F dB in each of 6 octave bands (125 Hz up to 4 kHz) .

The receiving room has a volume of 60+D·4 m3, and a reverberation time of 2+C/10 s.

Assuming that the wall obeys to the Mass Law, compute the SPL inside the receiving room at 1 kHz, and the total SPL, both in dB and in dB(A).

* SPL at 1 kHz dB (3 points)
* Total SPL-LIN dB (3 points)
* Total SPL A-weighted dB(A) (4 points)