# **­Applied Acoustics – 18 January 2019**

Name & Surname:

E

D

C

B

A

F

Matricula:

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

An omnidirectional point source is inside a normal room, where the environmental correction factor K2 is 2+D/10 dB. A microphone is located on the surface of a sphere surrounding the source, at a distance **r** of 1+F/10 m. The SPL measured by the microphone is 90+E dB. Compute the Sound Power Level of the source, and the values of Sound Pressure p (in Pa) and of Sound Intensity I (in W/m2) at the microphone location.

* Sound Power Level dB (re 1E-12 W) (4 points)
* Sound Pressure p Pa (4 points)
* Sound Intensity I W/m2 (4 points)

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

S

R

1+B/10

1+B/10

10+F

An omnidirectional point source, radiating a pure tone, is located outdoors, above an absorbing ground (=0.3+F/30), at an height of 1+B/10 m. The Sound Power Level Lw is equal to 100+D dB. A microphone is located at an horizontal distance of 10+F m, at the same height of the source.

Determine the values at the microphone of the direct SPL, reflected SPL and calculate the total SPL under the conservative hypothesis that the reflected sound is perfectly in phase withy the direct sound.

* Direct SPL dB (4 points)
* Reflected SPL dB (4 points)
* Total SPL dB (4 points)

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

Compute the total wide-band (unweighted) sound pressure level (SPL) in dB, and the total weighted SPL with “A” weighting in dB(A) of the following octave-band SPL spectrum.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| freq. (Hz) | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| Lp (dB) | **84+F** | **80+E** | **75+D** | **70+C** | **70+B** | **70+A** |

* Total sound pressure level dB (5 points)
* Total A-weighted SPL dB(A) (5 points)