# **­Applied Acoustics – 07 July 2017**

Name & Surname:

E

D

C

B

A

F

Matricula:

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

A point source is inside an anechoic room. It is surrounded by 10 microphones located on the surface of a sphere, having a radius **r** of 1+F/10 m. The average SPL measured by the microphones is 90+E dB. Compute the Sound Power Level, and the average values of sound pressure (in Pa) and of Sound Intensity Level which would be measured over a spherical surface having a radius double of the radius **r** where the microphones are located.

* Sound Power Level dB (re 1E-12 W) (4 points)
* Average sound pressure p at 2r Pa (3 points)
* Average Sound Intensity Level at 2r dB (re 1E-12 W/m2) (3 points)

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

S

R

1+B/10

10+A

An omnidirectional point source, radiating wide-band incoherent noise, 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 of the direct, reflected and total SPL at the microphone.

* 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 sound pressure level (SPL) in dB, and the total 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)