**Applied Acoustics - 12/12/2023 In-class test - Lecturer: Angelo Farina**

Note: some input data are based on the 6 digits of Matricula number, assigned to the 6 letters A B C D E F.

If you do not have yet a matricula number use your date of birth: DDMMYY.

If for example the matricula is 123456, it means that A=1, B=2, C=3, etc. .

Furthermore CD=34 (NOT 3x4), DE =45, EF =56.

Top of Form

**Surname and Name**

F

E

D

C

B

A

**Matricula**

1. **Check the sentences you think are always TRUE**  (multiple answers allowed)

* An omnidirectional microphone is only sensitive to sound pressure
* A cardioid microphone is only sensitive to sound pressure
* An omnidirectional microphone is only sensitive to particle velocity
* A cardioid microphone is only sensitive to particle velocity
* An omnidirectional microphone is sensitive half to sound pressure, half to particle velocity
* A cardioid microphone is sensitive half to sound pressure, half to particle velocity

1. **Ambisonics channels represent:**  (multiple answers allowed)

* Virtual microphones with complex directivity patterns
* Different physical quantities (sound pressure, particle velocity, etc.)
* Sound arriving from different angular sectors
* Wavefronts with different curvature
* Spherical harmonics functions
* Plane waves arriving from different directions

1. **A cardioid microphone is recording two sound sources, one located in front (on axis), one located at an azimuth of 60+5\*F degrees from front. What is the gain difference between the front and the lateral sources?**(write number and measurement unit)
2. **An ORTF microphone pair captures the sound from a far source, located on axis of the Left mike. Compute the time delay between the sound captured from the Left and Right mikes.**(write number and measurement unit)

1. **A microphone is placed 20+E cm in front of a reflecting wall. The sound is impinging on the microphone perpendicularly to the wall surface, and bounces back to the microphone.** **Compute the time delay between the incident and reflected sounds.**   
   (write number and measurement unit)
2. **A passenger train has a length-normalised SEL, stored in the DISIA database for a length of 100m, of 100+E dB. During the day period (16 h) 20+D trains, each 200+F\*10 m long, pass on the railways track. Compute the equivalent level at 7.5 m from the track.**(write number and measurement unit)

1. **Compute the level attenuation of a noise barrier, using the Citymap simplified formula, in the case of a path increment, δ, equal to 1+F/10 m.**

(write number and measurement unit)