**Applied Acoustics - 19/12/2022 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.

**Surname and Name**

F

E

D

C

B

A

**Matricula signature**

1. **Check the sentences you think are TRUE**

*multiple answers allowed: for each answer, 1 point if correct, -1 point if wrong, 0 point if "not selected"*

* A FIR filter can emulate any linear, time invariant system
* A FIR filter can emulate also not-linear and/or time-variant systems
* FIR filters can easily be implemented only with PCM data
* FIR filters an easily be implemented also with PDM, bitstream data
* FIR filters can control independently gain and phase
* IIR filters can control independently gain and phase

**2) Check the playback systems which provide periphonic reproduction (elevation)**

*multiple answers allowed: for each answer, 1 point if correct, -1 point if wrong, 0 point if "not selected"*

* Dolby Digital surround 5.1
* Binaural over headphones
* Binaural over a loudspeaker pair (stereo Dipole)
* Dolby Atmos
* Ambisonics, High Order Ambisonics
* Wave Field Synthesis

**3) Which of the following streaming portals supports natively Ambisonics 1st order?**

*Only one answer allowed, 1 point if correct, -1 if wrong, 0 if no answer*

* Apple Music
* Tidal
* Spotify
* Youtube
* Facebook
* Vimeo

**4) A third order cardioid microphone is synthesized from a Zylia microphone array. Compute the attenuation of a sound source located 50+F\*3 degrees off axis in comparison with a source located on axis at the same distance.**

(write number and measurement unit)

 **5) DISIA: Compute the emission level La,eq at 7.5m distance of a road carrying 1000+E\*100 cars/h having a SEL of 70+F dB(A) and 100+D\*10 trucks/h having a SEL of 80+C dB(A).**

(write number and measurement unit)

 **6) DISIA: Compute the excess attenuation due to air absorption when Beta=0.0018 m-1, neglecting the spherical divergence factor 4πd², for a propagation distance d of 100+F\*20 m.**

(write number and measurement unit)

 **7) Ramsete: an omni sound source is located at the origin, coordinates (0,0,0). Two receivers are located at (C,D,1.2) and (E,F,1.5) - Compute the delay between the time of arrival of direct sound on the two receivers (t1-t2),**

 (write number and measurement unit)

**8) Ramsete: an omni sound source is located at the origin, coordinates (0,0,0). Two receivers are located at (C,D,1.2) and (E,F,1.5) - Compute the SPL difference between the levels of the direct sound on the two receivers (Leq1-Leq2).**

(write number and measurement unit)