**Applied Acoustics - 14/11/2022 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**

A

B

C

D

E

F

**Matricula signature**

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

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

* An impulse response can only be measured using an impulsive source
* An impulse response can only be measured using special test signals (MLS, ESS, etc.)
* An impulse response can be measured using any kind of test signal (including speech, music, noise)
* The narrow-band spectrum of a perfect pulse (Dirac's Delta) is flat (white)
* The octave-bands spectrum of a perfect pulse (Dirac's Delta) is flat (pink)
* Impulsive sources (balloon, firecracker, pistol, clapper) provide a good S/N ratio

**2) What's the purpose of using directive microphones when measuring impulse responses?**

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

* There is no purpose, only OMNI microphones are allowed in the ISO 3382 standard
* A pair of <omni> + <figure of 8> is useful for measuring the Lateral Fraction Jlf
* A pair of binaural microphones is useful for measuring IACC
* An High Order Ambisonics microphone array is useful for measuring both Jlf and IACC
* A <shotgun> microphone is useful for removing unwanted echoes and reflections

**3) What is the most common variant of reverberation time?**

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

* T60, measured along the sound decay from 0 to -60 dB
* T30, measured along the sound decay from -5 to -35 dB
* T20, measured along the sound decay from -5 to -25 dB
* T10, measured along the sound decay from -5 to -15 dB
* EDT, measured along the sound decay from 0 to -10 dB
* None of the above

**4) The level decays from -5 dB to -35 dB in 1+F/10 s. Compute the reverberation time T30.**

(write number and measurement unit)

**5) Clarity C50 in a large auditorium is equal to -(2+F/10) dB. There are no early reflections arriving in the first 50ms following the direct sound. A room treatment is applied, which halves the reverberation time. Compute the new value of Clarity C50.**

(write number and measurement unit)

**6) In a large room there are no reflections in the first 80 ms following the direct sound. A sound reflector is added on the side of the stage, causing a reflection to arrive with an azimuth of 40+E degrees and an amplitude 1+F/4 dB weaker than the direct sound. Compute Jlf.**

(write number and measurement unit)

**7) Compute the duration of an MLS signal of order (10+F) at a sampling frequency of 48000 Hz.**

(write number and measurement unit)

**8) Without considering the background noise, the STI is measured to be equal to 70+F %. Recalculate the value of STI with a S/N ratio of 5+E dB.**

(write number and measurement unit)