**Applied Acoustics – Test 4/2020 In-class test - Lecturer: Angelo Farina**

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

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.

If L =100+E\*10 the results is 100+(5\*10) = 150 (the product has precedence over the addition).

Top of Form

**Surname and Name**

F

E

D

C

B

A

**Matricula**

1. **What is the definition of the Single Event Level SEL?**

*one answer only: 1 point if correct, -1 point if wrong, 0 point if "no answer"*

* It is the max instantaneous SPL caused by the passage of a vehicle
* It is the average SPL during the time of passage of a vehicle
* It is the "dose" of acoustical energy associated with the passage of a vehicle
* It is the value measured during homologation of a vehicle and written on the document
* It's the A-weighted equivalent level measured during 1s, during which the SPL caused by the vehicle passby is maximum
* I do not know (no answer)

**2) What is the definition of the Personal Exposure Level Lep?**

*one answer only: 1 point if correct, -1 point if wrong, 0 point if "no answer"*

* It is the A-weighted equivalent level measured during an 8-h work day
* It is the A-weighted equivalent level measured during the duration of the work day
* It is the A-weighted equivalent level measured during the duration of the work day and rescaled to a nominal duration of 8h
* It is the SEL measured during the duration of the work day
* It is the SEL measured during the duration of the work day and rescaled from 1s to 8h
* I do not know (no answer)

**3) Which methods can be used for measuring the absorption coefficient of a small sample of material, measuring just a few cm per side?**

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

* ISO 354 in a reverberant room
* ISO 10534 Standing Wave Tube
* EN 1793-5 Impulsive Method
* Sound Intensity method in free field
* Sound Intensity method in a reverberant room
* Sound Intensity method inside a tube

**4) Which of the following convolution algorithms provide higher performances on a modern computer?**

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

* direct form convolution in time domain
* single-large-block (unpartitioned) overlap-and-save using FFT (Oppenheim-Shafer book)
* small-blocks (uniformly partitioning) overlap-and-save using FFT (Anders Torger, BRUTEFIR)
* variable-blocks (not-uniformly partitioned) overlap-and-save using FFT (Fons Adriaensen, J-conv, MCFX))
* hybrid method (Barry Kulp): a first block in direct form for zero-latency, followed by uniformly-partitioned blocks (Zoran DSP)
* hybrid method (Bill Gardner): a first block in direct form for zero-latency, followed by not-uniformly-partitioned blocks (Lake DSP; Dolby)

**5) Compute Leq at the distance of 50+Fm from a road where each hour 500+E\*30 cars are passing, each producing a SEL of 80+D dB(A) at the reference distance of 7.5 m.**

*write number and measurement unit*

**6) Compute Lep for a worker spending his (long) work day as follows: 4h at 75+F dB(A), 2h at 83+E/5 dB(A) and 4h at 79+D/4 dB(A).***write number and measurement unit*

**7) In a reverberant room having a volume of 200 + D\*10 m3 the following data are measured: T1 (empty) = 6+F/4 s , T2(sample) = 2+E/5 s. The sample is made of 12 upholstered seats for a concert hall. Compute the equivalent absorption area A of one seat.**

*write number and measurement unit*

**8) A measurement is performed using the EN 1793-5 method in normal incidence. The microphone has a distance dsm from the source of 1+D/10 m, and a distance dm from the noise barrier of 0.3+E/5 m. The direct sound has an SPL=100 dB, and the reflected sound has an SPL of 80+F dB. Compute the absorption coefficient of the noise barrier.**

*write number and measurement unit*