Digital tools exam
2020-2021

Sections : PCC, FAS, AMER, AS, EUR, SCAN
Rating scale : 51 points, normalized to 20
(1pt / lecture question, 2pts / computation)
Duration : 1h
Documents : forbidden
Calculator : forbidden

Numéro étudiant :

1 Instructions

— Do not fold the copy !
— Blacken the cells with a black pen : do not surround the cells !
— To correct : whiten the cell, without rebuilding it.
— The whitening of the cell must be very clean and should not leave any shadow.
— The student number must be checked !
— Do not restart the MCQ with a new subject, you would have to start from the begining as all the question may be different
— The subject is double-sided

2 Lecture questions

Rating scale : a correct response is worth 1, and the lack of answer is worth 0. Otherwise the score is the pro-rata between the number of correct and incorrect answers. The score cannot go below -0,5.

Figure 1

Question 1 If I write a report on Libre-Office, which file format must I send to my teacher ?

[X] .pdf [ ] .docx [ ] .odt [ ] .ods
[ ] .ott [ ] .dotx

1/1

Question 2 Wanting to put the division 1/3 in a spreadsheet, I write exactly the following text : . Which result should be displayed in the cell?

[ ] 0,333333€ [ ] 33% [X] 01/03/20
[●] 0,333333

-0.3333/1

Question 3 What is the approximate world electricity consumption dedicated to digital technologies ?

[X] 7% [ ] 0,5% [ ] 1% [●] 3%

-0.3333/1

Question 4 Among the following statements, which ones are correct for a spreadsheet :
[●] In the reference A1, the column is fixed, but not the line
[X] The reference A1 is a relative reference
[X] In the reference $A1, the column is fixed
[ ] When copying/pasting an absolute reference, it is updated to adapt to its new location.

-0.5/1

Question 5 What is composing an Arithmetic logic unit (ALU)?

[ ] Non of the other answers [ ] RAM
[X] Logical gates [ ] Cells

1/1

Question 6 Which of the following memory types has the fastest access time?

[ ] RAM [ ] Hard drive disk [X] Registers
[ ] Cache

Question 7 When a report is correctly created, which elements can be automatically generated by the word processor ?
[X] Table of content
[●] Virtual table of global structuration
[X] Chapters numbering
[X] Table of figures

Question 8 What are the risks if I choose an INSA password that is too weak ?
[X] that attacks are done with my identity
[ ] that I validate the Digital Tools module
[ ] that my teacher scolds me
[X] that spams are sent with my identity

Question 9 Among the following extensions, which ones corresponds to a word processor ?

[●] .txt [ ] .ods [X] .odt [ ] .csv
[X] .docx [X] .ott

Question 10 When adding a figure in a report, which actions are mandatory in the context of a scientific report ?
[X] Number the figure
[ ] Add a legend on top of the figure
[X] Cite the figure [X] Comment the figure

Question 11 Let us consider the graph of Figure 1, recently published in French media. Which corrections would have been necessary to publish it in a scientific communication.
[X] display the scale/graduation
[X] display the axes
[X] display the units
[ ] display a linear interpolation
[ ] display error bars

Question 12 Which path expantor is correctly associated with its OS ?
[ ] / - Windows [X] \ - Windows
[X] / - Linux [ ] \ - Linux

Question 13 What are the purposes of a virtual machine ?
[ ] To execute software that is specifically virtual
[X] To migrate a virtual machine in the cloud
[X] To run Solid Edge on MacOS
[X] To handle load distribution in data centers

Question 14 The firmware is a piece of code that is executed on :
[●] the main processor [ ] the computing unit
[ ] the control unit [X] a peripheral device

Question 15 Let us consider the number FAF9 in hexadecimal ; we can say that
[X] it is represented with an alphabet composed of 16 symbols.
[X] its binary representation is on 16 bits.
[ ] it necessarily represents a negative number.
[ ] this number is composed of 4 bits.

-0.3333/1

Question 16 At which step of its lifecycle the carbon footprint of a smartphone is the highest ?
[●] Playing 4K videos on 4G in an elevator
[ ] Usage [X] Harvesting of raw material
[ ] Recycling [ ] Manufacturing

-0.25/1

Question 17 The RAM memory is volatile (it is erased when the computer is turned off). Which type of memory is necessary to ensure that data is preserved after the shutdown of the computer?
[ ] ROM [ ] Dead memory
[ ] Cache memory [X] Mass storage

0/1

1/1

3 Computations

Only one correct answer per question.
Scale : a correct answer is worth 2, the lack of answer is worth 0 and an incorrect answer is worth -1.

0.3333/1

3.1 Base change and two's complement

Question 18 What is the hexadecimal representation of -29_{10} (signed and on 8 bits)
[X] $E3_{16}$ [ ] $1D_{16}$ [ ] $-1D_{16}$
[ ] The question is incorrect
[ ] None of these answers is correct.

1/1
2/2

Question 19 What is the two's complement of $0001\ 1011_2$ (signed and on 8 bits) ?
[ ] $-0001\ 1011_2$ [ ] $1110\ 0100_2$
[X] $1110\ 0101_2$ [ ] $1001\ 1011_2$

1/1
2/2

Question 20 What is the representation in base 10 of $F0_{16}$ (unsigned and on 8 bits) ?
[X] 240_{10} [ ] $1111\ 0000_{10}$ [ ] -16_{10}
[ ] The question is incorrect
[ ] None of these answers is correct.

0.3333/1
2/2

-0.3333/1

Question 21 What is the representation in base 16 of 736_{10} (unsigned and on 16 bits)?

☐ 0000 0010 1111 0100₁₆
☐ The question is incorrect   ☒ 02 F4₁₆
☐ 1 878₁₀   ☐ *None of these answers is correct.*

2/2

Question 22 What is the binary representation of 128_{10} (signed and on 8 bits)?

☐ 1000 0001₂   ☒ 1000 0000₂
☒ The question is incorrect   ☐ 0000 1111₂
☐ *None of these answers is correct.*

2/2

3.2 Multiple interpretations

Given the following binary sequence on 8 bits :

1010 0010

Answer the 3 following questions :

Question 23 Assuming that is the binary representation of a signed integer, what is its representation in base 16?

☒ A2₁₆   ☐ −12₁₆   ☐ −A1₁₆
☐ 12₁₆   ☐ *None of these answers is correct.*

2/2
-0.5/2

Question 24 Assuming that is is the binary representation of a signed integer, what is its representation in base 10?

☒ −94₁₀   ☐ 94₁₀   ☐ 162₁₀
☐ −162₁₀   ☐ *None of these answers is correct.*

Question 25 Assuming that is is the binary representation of an unsigned integer, what is its representation in base 10?

☒ 162₁₀   ☐ −94₁₀   ☐ 94₁₀
☐ −162₁₀   ☐ *None of these answers is correct.*

4 Open questions

Scale : a correct answer is worth 2, the lack of answer is worth 0 and an incorrect answer is worth -0.5.

4.1 Unsigned integers on 8 bits

Question 26
```
  0101 0111
+ 1110 1101
```

Question 27
```
  0010 0111
× 1001 0000
```

Question 28
```
  0001 1101
+ 0111 1100
```

Question 29
```
  1101 1111
× 0100 1011
```

Question 30
```
  1010 1000
− 1000 0111
```

Question 31
```
  0000 1101
× 0100 0100
```

0/2

Question 32
```
  1101 1010
/ 0010 0000
```

2/2

Question 33
```
  1000 1100
− 0001 0111
```

-0.5/2

4.2 Floating point conversion

Question 34 What is the single precision floating point encoding (IEEE 754) of **28.7** ? *Reminder : do not write annotation on this copy. Use a draft paper instead.*

2/2