



SURNAMES:

Name:

■ Test 4 pts. Right answer $\Rightarrow$ 0,4 Wrong $\Rightarrow$ - 0,1 No answer $\Rightarrow$ 0

- 1) Point the **WRONG** statement
- ☐ 1Gbyte is 2^{10} Kbytes
 - ☐ 1Mbyte is 2^{20} bytes
 - ☐ 1Kbyte is 2^{10} bytes
 - ☐ 1 byte is 2^3 bits
- 2) Which is the logical gate that produces “1” as output **JUST** when the two inputs are equal?
- ☐ XOR
 - ☐ AND
 - ☐ OR
 - ☐ XNOR
- 3) The order of execution cycles in a Von Neumann architecture is:
- ☐ Fetch instruction, decode, fetch operand, execution, store results, update PC
 - ☐ Update PC, decode, fetch instruction, fetch operand, execution, store results
 - ☐ Fetch instruction, decode, fetch operand, update PC, execution, store results
 - ☐ None of the previous options is correct
- 4) Machine language:
- ☐ It is a set of mnemonics or symbolic names
 - ☐ It is the same for all computers
 - ☐ It facilitates the portability of programs
 - ☐ None of the previous options is correct
- 5) In an asynchronous up counter, what is the clock input of the bistable that stores the least significant bit connected to?
- ☐ To the clock
 - ☐ To the output Q of the bistable that stores the second least significant bit
 - ☐ To the output Q! of the bistable that stores the second least significant bit
 - ☐ None of the previous options is correct
- 6) What is the decimal value of the C1 number 11100100?
- ☐ 228
 - ☐ -27
 - ☐ -228
 - ☐ None of the previous options is correct
- 7) If A = 01111111 y B=11111111 are represented in C2, the sum A + B has the decimal value::
- ☐ 382
 - ☐ -127
 - ☐ 126
 - ☐ None of the previous options is correct
- 8) One of the canonical forms of the function $S(A,B,C,D)=CD$ is:
- ☐ $S = A!B!CD + ABCD$
 - ☐ $S = ABCD + A!B!C!D! + A!B!CD + ABC!D!$
 - ☐ $S = ABCD + A!B!CD + A!BCD + AB!CD$
 - ☐ None of the previous options is correct
- 9) What value does the output of a bistable JK take when J=1, K=0, is connected to the input?
- ☐ $Q^{t+1}=0$
 - ☐ $Q^{t+1}=1$
 - ☐ $Q^{t+1}=Q^t$
 - ☐ $Q^{t+1}=Q^t!$
- 10) If a CPU can address a 256M x 32 memory, then
- ☐ The system has a 29-line data bus and a 32-line address bus.
 - ☐ The system has a 32-line data bus and a 29-line address bus.
 - ☐ The system has a 27-line data bus and a 32-line address bus.
 - ☐ None of the previous options is correct



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EXERCISE 1 (2 points)

A simple geopositioning system consists of 4 satellites. Design a circuit for the terrestrial receiver that warns by turning on a LED when it receives the signal from at least 3 satellites and therefore can correctly calculate the position (assume that each of the signals received correctly from the satellites produces a "1" at the input of the circuit to be designed).



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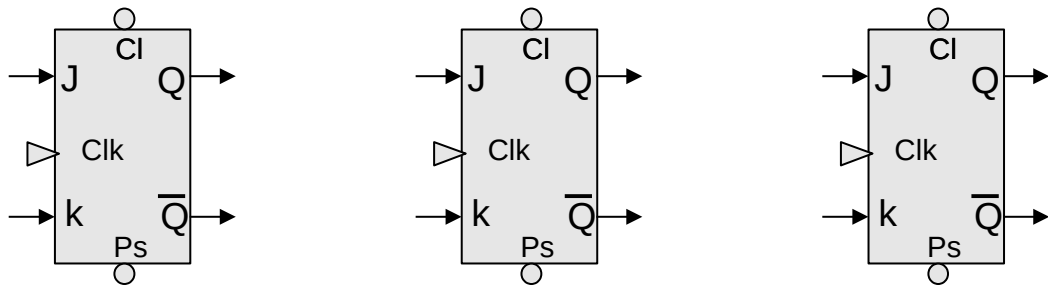
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EXERCISE 2 (2 points)

Make the connections in the following diagram to build a counter that follows the sequence 0, 5, 2, 6. Add the necessary logic gates

Vcc

Gnd



Clk



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EXERCISE 3 (2 points)

In a CPU with 64 bits in the data bus and 30 bits in the address bus it is required to install a memory system with the following characteristics:

- 512M x 64 of RAM memory in the higher memory positions
- 256M x 64 of ROM memory in the lower memory positions

For that purpose an unlimited amount of the following chips are available:

- 256M x 64 memory chips
- 256M x 32 ROM memory chips

- a) Draw the memory map indicating the first and the last address of each chip.
- b) Indicate the connections to the CS input of each chip.