Introduction to Computer Studies ICS2O G10

Term 1 Test 1

Date: Thu. Nov. 8, 2018

Full Name:

Instructions

1. Write your name above, under the date.
2. No scientific calculator is allowed.
3. All questions have the same value towards the final mark.
4. For questions 10 and 11, *You must pick just one of the two questions.*

Notes

- $16^2 = 256,\ 16^3 = 4096,\ 16^4 = 65536,\ 15 \cdot 16 = 16^2 - 1$
- $2^{12} = (2^4)^3$

Questions

1. (50% = 5/8 *KA* + 3/8 *TI*) The following are binary numbers. Write the decimal expression of each of them. Example: 1001 1001=153.

    1. 0100 1000 0010 =
    2. 1000 0001 0100 =
    3. 0010 0100 1000 =
    4. 0001 0010 0001 =
    5. 0000 0000 1111 =
    6. 0000 1111 1111 =
    7. 1111 1111 1111 =
    8. 0111 1111 1111 =

2. ($10% KTI) State what mathematical operation corresponds to shifting all bits 1 position to the right. Illustrate your explanation for the case 011.

3. (40% = 4/6 K+ 2/6, C) Write the binary expression of the following numbers. Use the division method and show your calculation at least for 2 cases.

    1. 251 =
    2. 66 =
    3. 127 =
    4. 362 =

4. (50% = 5/8 KA + 3/8 TI) The following are hexadecimal numbers. Write the decimal expression of each of them.

    1. $00F$ =
    2. $0FF$ =
    3. FFF =
    4. $FF0$ =

5. ($10%, KTI) State what mathematical operation corresponds to shifting all bits 1 position to the left. Illustrate your explanation for the case $00F$.

6. (40% = 4/6 K+ 2/6, C) Write the hexadecimal expression of the following numbers. Use the division method and show your calculation at least for 2 cases.

    1. 251 =
    2. 66 =
    3. 127 =
    4. 362 =

7. (10% KC) Identify and sketch the diagram of the 3 basic logic gates. Label all inputs and outputs. Write as well the truth table

8. (80% AC) Write the logic circuit corresponding to the following expression `NOT ( x AND ( y OR z ) )`. Write as well the truth table

9. (10% TIC) Write the truth table corresponding to the following expressions `A) NOT( x AND y)  B) (NOT x) OR (NOT y)`. Are they equivalent expressions? Why?

10. Draw two different logic circuits that give rise to an XOR gate

11. Draw a diagram of how we can build a NAND gate using two transistors