



ELIZADE UNIVERSITY ILARA-MOKIN

FACULTY: BASIC AND APPLIED SCIENCES
DEPARTMENT: MATHEMATICS AND COMPUTER SCIENCE
2nd SEMESTER EXAMINATION
2020/21 ACADEMIC SESSION

COURSE CODE: CSC 208

COURSE TITLE: Digital Logic

COURSE LEADER: Mr. O. Babalola

DURATION: 2 Hours

HOD's SIGNATURE

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INSTRUCTION:

Candidates should answer any **FOUR** Questions. **Question 6 is compulsory.**
Students are warned that possession of any unauthorized materials in an examination is a serious assessment offence.

1. What is the ALU? Describe with diagram the circuit of one of the devices making up the ALU. What are the functions of the ALU?
Explain with a block diagram how the ALU is able to carry out its functions.
Is an ALU in microcontrollers? If any, describe the relationship between the ALU & microcontrollers.
2. A. Why would you minimize a boolean function?
B. Use examples to illustrate the various ways of minimizing boolean functions.
C. Minimize $\overline{A}B\overline{C} + \overline{A}BC + A\overline{B}\overline{C} + A\overline{B}C + ABC + A'B'C'$
D. Write $\overline{A}B\overline{C} + \overline{A}BC + A\overline{B}\overline{C} + A\overline{B}C + ABC + ABC + \overline{A}B\overline{C}$ in Canonical form
E. What is the Canonical form?
3. A. Mention some ways a combinational net can be represented
B. Is $x \cdot x$ a combinational net? Hence prove that $x \cdot x = x$ explaining each step too.
C. Minimize $x(a, b, c) = \Sigma(2, 4, 6)$
D. Minimize $x(a, b, c) = \Sigma(2, 4, 6) + d(0, 7)$. Compare with 3c. above and explain if there is any difference and why
E. Write the dual canonical of the function x given in 3c.

4. A. Draw $((a'b + bc)a)'$. How many levels does the network have?
B. If $x + 1 = 1$, $x + x = ?$
C. What three things can you say about each of the following numbers in the signed representation format?
a. 1000000000000000_2
b. 1000000000000001_2
c. 0000000000000001_2
D. A 12-bit memory location contains $F7B_{16}$. What is the decimal number stored in the location? Use diagrams and illustrate each step of your work.
5. Explain with diagrams the operations of a SR-latch and a Flip-flop
Describe a Selective Inverter
Describe one application of the Enable
What is Boolean Algebra
Write a 4 variable boolean expression, draw its diagram and hence, minimize it.
6. a. Design or present a digital device based on a multiplexer, and explain its applications and operations. Use a diagram and truth table of the presented device to aid your description. (Note that this is not a question to present a multiplexer but rather to show an application of the same). (10 marks)
b. With any 4-variable example, show with the aid of illustrations, the various possible representations of an appropriate Boolean/digital logic system. Your chosen 4-variable system must be in canonical form. You are to present at least 5 different representations of the system. (10 Marks)
c. Using two different approaches, minimize the 4-variable Boolean system from 1b above. Compare your results. (5 Marks)