



Student Name:
Student Number:
Serial Number:

First Exam, First Semester: 2018/2019
Dept. of Computer Engineering

Course Title:	Logic Circuits	Date:	18/11/2018
Course No:	630211	Time Allowed:	50 Minutes
Lecturer:	Dr. Qadri Hamarsheh	No. Of Pages:	4

Instructions:

- **ALLOWED:** pens and drawing tools (**no red color**).
- **NOT ALLOWED:** Papers, calculators, literatures and any handouts. Otherwise, it will lead to the non-approval of your examination.
- **Shut down** Telephones, and other communication devices.

Please note:

- This exam paper contains 6 questions totaling 20 marks
- Write your name and your matriculation number on every page of the solution sheets.
- All solutions together with solution methods (explanatory statement) must be inserted in the labelled position on the solution sheets.
- You can submit your exam after the first hour.

Basic notions: The aims of the questions in this part are to evaluate the required minimal student knowledge and skills. Answers in the pass category represent the minimum understanding of basic concepts: Digital Systems, Binary Number Systems, Boolean algebra and Basic Logic Gates.

Question 1 Multiple Choice

(8 marks)

Identify the choice that best completes the statement or answers the question.

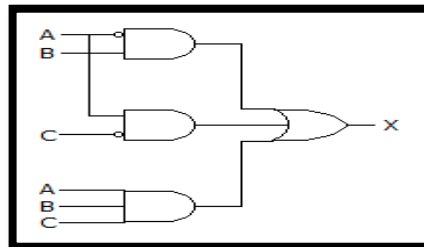
- Convert the hexadecimal number $14B_{16}$ to binary.

a) 110101000001_2	b) 000101001101_2
c) 000101001011_2	d) 101101000001_2
- $(734)_8 = ()_{16}$

a) 1DC	b) C1D
c) DC1	d) 1CD
- Convert 59.72_{10} to **BCD**.

a) 111011	b) 0101100101110010
c) 1110.11	d) 01011001.01110010
- The range of decimal numbers that can be written in 6 bit sign magnitude form:

a) -31 to 31	b) 0 to 64
c) -32 to 31	d) -64 to 64
- The circuit given below implements the equation, $X = \bar{A}B + \bar{A}\bar{C} + ABC$.



- | | |
|----------------|-----------------|
| a) True | b) False |
|----------------|-----------------|

Familiar and Unfamiliar Problems Solving: The aim of the questions in this part is to evaluate that the student has some basic knowledge of the key aspects of the lecture material and can attempt to solve familiar and unfamiliar problems of Boolean Expression Simplification, Karnaugh Maps and Logic Diagrams.

Question 2

(2 marks)

Draw the Logic Circuit diagram for the following Boolean expression

$$Q = \overline{A+B} + \overline{A} \cdot (C+B)$$

Solution

Question 3

(2 marks)

Simplify the following expression.

$$Q = B \cdot C \cdot (\overline{C} + D) + C \cdot D + C + \overline{A}$$

Solution

Question 4

(2 marks)

Examine the following truth table and then write both **SOP** and **POS** Boolean expressions describing the output:

A	B	C	Output
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

Solution

Question 5

(2 marks)

Express $X + YZ$ as the sum of minterms.

Solution

Question 6

(4 marks)

Simplify the following Boolean expressions using a Karnaugh map.

$$F(A, B, C, D) = \overline{(C + D)} + \overline{A}C\overline{D} + A\overline{B}\overline{C} + \overline{A}\overline{B}CD + AC\overline{D}$$

Solution

GOOD LUCK