B.Sc. Engg. SWE 2nd Semester   29 August 2019 (Morning)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION   **SUMMER SEMESTER, 2018-2019**
DURATION: 1 Hour 30 Minutes   **FULL MARKS: 75**

CSE 4205: Digital Logic Design

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them.
Figures in the right margin indicate marks.

---

1. a) Convert the followings: 2.5x4
        i. $(41.687)_{10} = (?)_2$ ii. $(DADA.B)_{16} = (?)_{10}$
        iii. $(153.513)_{10} = (?)_8$ iv. $(198)_{12} = (?)_{10}$
        Hints: Calculate maximum upto 3 digits after the decimal point where necesssary. You have
        to show the procedures, only values produced by the calculator will not suffice.
    b) Describe odd parity and even parity with example.   5
    c) i.   What is radix complement and diminished radix complement?   2+4+4
        ii.   By r's complement perform: $(-9286)_{10} + (+801)_{10} = (?)_{10}$
        iii. By (r-1)'s complement perform: $(1000100)_2 - (1010100)_2 = (?)_2$

2. a) What is parity bit? Define odd parity and even parity with examples.   1+2+2
    b) Define BCD. Perform addition after converting the values into BCD: $(791)_{10} + (658)_{10} = (?)_{10}$ 1+4
    c) Simplify the boolean expression using K-map for -   15
        $\sum m(0,4,6,8,12,13,14,15,16,17,18,21,24,25,26,28,29,31)$

3. a) Define followings with example: 2x5
        i.   Grey Code   ii.   Checker Board Pattern
        iii. Product of Sum   iv.   Sum of Product
        v.   Universal Gate
    b) Draw the circuits and write the boolean expressions for the following gates using nand gate: 2x6
        i.   AND   ii.   OR
        iii. XOR
        Repeat the instruction for i-iii but this time using nor gate.
    c) What will be the simplified boolean expression for this K-map?   1+2
        Prove the expression using a truth table.

	00	01	11	10
0	0	1	0	1
1	1	0	1	0

Figure 1: K-map

4. a) Define combinatorial & sequential circuit with example.   1.5x2
    b) What is full adder? For sum and carry of a 1-bit full adder, give boolean expression, truth   1+6
        table and circuit diagram.
    c) Simplify the boolean expression using Tabular method for $\sum m(2,3,4,5,6,7,9,13,15)$ 15