THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF COMPUTER SCIENCE
B.SC. DEGREE PROGRAMME
NO BOOK TEST 1 – (2016-2017)
CPU3141: DIGITAL COMPUTER FUNDAMENTALS
DURATION: ONE AND HALF HOUR (1HOUR)

Date: 26.09.2017 **Time: 4.15 pm – 5.15 pm**

Answer **All** Questions

Q1.

1. Derive the **Product of Sum (PoS)** term for output **F** in the following truth table.

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0

2. **Simplify** the Boolean expression derived in 1 using **Boolean Logic Rules**.
3. Draw the **simplified logic circuit**.
4. There is a circuit that counts the number of 1's present in 3 inputs A, B and C. Its output is a two-bit number X1 and X0, representing that count in binary. (Assume active-HIGH logic.)
    a. Draw the **truth table** for the circuit.
    b. Considering Positive logic (PoS terms) draw the **K'Maps** for the output X1 and X0.
    c. Draw the **logic circuit**.

Q2.

1. What is **Combinational Logic**? Explain with the help of a block diagram.
2. Draw a **4-bit Adder** to add 1101_2 and 1000_2.
3. Using the truth table and logic circuit explain the function of the **Decoder**.
4. Draw the logic circuit of **3-to-8 Decoder**.
5. Redraw the 3-to-8 **using only 1-to-2 Decoders**. (use the block diagrams)

Q3.

1. What is a **Sequential Logic Circuit**? Explain with the help of a block diagram.
2. **Flip-Flop** is considered as the basic building block of the sequential circuits. Explain the **function** of **S-R Flip-Flop** using **truth table** and **logic circuit**.
3. Draw the **timing diagram** for the **Clocked S-R Flip-Flop**.
4. Draw the Block diagram for a **Master-Slave J-K Filip-Flop**.
5. What are the steps in **realizing** a Flip-Flop from another type of Flip-Flop?