The Open University of Sri lanka
B.Sc Degree Programme – Level 05
Department of Mathematics and Computer Science
No Book Test 2011/2012
CPU3141 : Digital Computer Fundamentals

Duration:**One and Half hours only (1.5 hrs)**

Date:**01.03.2012** Time:**04.00 pm – 05.30 pm**

Answer ALLQuestions

Q1.

a. Prove the following rules. Consider A, B and C as boolean parameters.
   i. Distributive Law
   ii. Associative Law

b.
   i. Get the Boolean expression for the output of the following truth table.

Inputs			Output
C	**B**	**A**	**Y**
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

   ii. Minimize the expression for Y using Boolean rules. State the rule.
   iii. Draw the Logic circuit for Y.

c. Minimize the following truth table using **K-map** method.

Inputs				Output
D	**C**	**B**	**A**	**Y**
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0

1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

Q2.

a. What are the uses of following digital components?
   i. Demultiplexer
   ii. Decoder
b. Describe the function of the **Multiplexer**.
c. Convert following base 10 numbers into base 2.
   i. 27.25
   ii. 101.02
d. Represent following numbers in **One's complement** and **Two's complement**. (consider 8 bit represenatation)
   i. +15
   ii. -15
e. Draw the **Adder circuit** fot 3 bit binary addition opearion.

Q3.

a. What are the differences between **Sequential Logic** and **Combinational Logic**?
b. Draw the block diagrams to represent **Combinational Logic** and **Sequential Logic**. Describe the function of both the logics.
c. What are the classes of **Sequential Logic**?
d. What is known as a **Circuit Hazard**? Give an example circuit.
e. Draw the circuit diagram and Timing diagram for **Clocked S-R Flip Flop**.