MCA-115 **Roll No.** | | | | | | | | | | |

MCA
(SEM I) ODD SEMESTER EXAMINATION 2015-16
Digital Logic Design

[Time: 3 hrs.] **[Max. Marks: 100]**

Note- ***Attempt All Questions. All Questions carry equal marks*:-**

1. Attempt any four parts of the followings:- **[5x4=20]**

(a) Discuss the scope of digital logic design.

(b) What is Gray code? Give the advantages of Gray code over Binary code write the Gray code for a 4 bit binary no.

(c) Perform the following subtraction using 1's complement & 2's complement method

(i) $(11010)_2$-$(10000)_2$

(ii) $(1000100)_2$-$(1010100)_2$

(d) Carry out the following conversion
Decimal 268.75 to binary, Octal & Hex.

(e) Simplify the following Boolean equation using Boolean algebra.
$Y(A, B, C) = ABC + A\overline{B} + AB\overline{C}$

(f) State and explain De Morgan's theorems.

2. Attempt any four of the following:- **[5x4=20]**

(a) Design a combinational logic circuit with three input variables that will produce logic 1 output when more than one input variables are logic 0.

(b) Design full adder using half adders.

(c) Discuss the limitation of N-bit parallel adder. How it is overcome?

(d) Design 2 bit comparator.

(e) Design a 8:1 multiplexor.

(f) Design a BCD to Excess-3 code converter using truth table, K-map and logic circuit.

3. Attempt any two of the following:- **[10x2=20]**

(a) What do you understand by sequential circuits? Differentiate sequential circuits with combinational circuit. Design basic Circuit for RS flip flop. Explain its working & limitations

(b) Design a 4 bit binary ripple counter

(c) Draw the logical diagram of a 4 bit shift register. Explain how shift left and shift right operations are performed?

4. Attempt any two of the following:- **[10x2=20]**

(a) Draw basic block diagram of M**X**N memory and explain its functions.

(b) How memory size & word size can be expanded?

(c) Discuss basic concepts of construction of ASM charts for sequential circuits.

5. Attempt any two of the following:- **[10x2=20]**

(a) Differentiate synchronous and asynchronous sequential circuits. Discuss different types of hazards in asynchronous circuit.

(b) Describe design procedure for asynchronous circuit.

(c) Draw an equivalent ASM chart for the state diagram given below. It has four states and two inputs x & y.