12. Perform the following subtraction using 2's complement
    a. 1101 -1001
    b. 01000-01001

13. What is PLA (Programmable Logic Array)

SECTION C

14 a. Differentiate b/w Decoder & Multiplexer.
   b. Design 4x16 decoder using 2x4 decoders with enable line.
   c. What is half Adder? Write truth table for a half Adder.

15. a. Convert the following to other canonical form
    $F(A,B,C,D) = \pi(0,1,2,3,4,6,12)$
    b. Write Short notes on
       i. RAM and ROM
       ii. Virtual Memory
       iii. Cache Memory
       iv. Logic gates.
       v k-map

Roll No.....

BCA 201(O)

B.C.A (Semester- II) Exam.-2014

(Old Course)

Paper: I

Digital Principles and Applications

Time: Three Hours] [Maximum Marks: **75**

Note: Section A is compulsory. Attempt seven questions from Sec B , One question from Section C.

Section-A

Note: Attempt any ten questions from Section 'A'.

1. Perform the following conversions
   a. $(346)_{10} \rightarrow (?)_{16}$
   b. $(255.321)_{10} \rightarrow (?)_{8}$
   c. $(011.01011)_{2} \rightarrow (?)_{10}$
   d. $(76A)_{16} \rightarrow (?)_{8}$

2. State and prove the two basic Demongan's theorem.

3. Why NAND and NOR one known as Universal gates. Show the convention of each basic gate (AND, OR, NOT), starting from NAND and NOR respectively.

SECTION B

4. Simply the following expression using Boolean theorem

$$Z = \bar{A}\,B\bar{C} + AB\bar{C} + B\bar{C}D$$

5. Design 16x1 multiplexer using 8x1 with 2x1 multiplexer.

6. Construct a logic circuit for the given Boolean expression

$$(X + Y + Z)(X + \bar{Y})(\bar{X} + \bar{Y})$$

7. Convert 430 into
   a. Excess 3code
   b. Gray code
   c. BCD

8. What is full adder? Design full Adder using with half Adder.

9. What is A/D (Analog to digital) converter? Discuss any two types of A/D converter.

10. Perform the following function using k-map

$$f(w, x, y, z) = \sum(0,2,4,6,8,10,12,14,15)$$

11. Write short notes on
    a. Error- detecting code
    b. Error- correcting code