B.Sc. II Semester Examination 2021
Department of Computer Science, BHU
Paper code: CS-102: Digital Logic and Circuits

Time allotted: 1:30 hrs **Max. Marks: 20**

Answer all questions

1. (a) $(2B)_{16} + (101)_8 + (101.2)_6 + (101101)_2 = (?)_3$ [1×5=5]
   (b) Perform subtraction with the following binary number using 1's complement:
   11010-11001
   (c) Using 10's complement, subtract **31** from **43**.
   (d) Implement the function **Π(0, 2,4, 5)** using NOR gates only.
   (e) What is the largest 8 bit binary number? What is its Octal and Hexadecimal equivalent?

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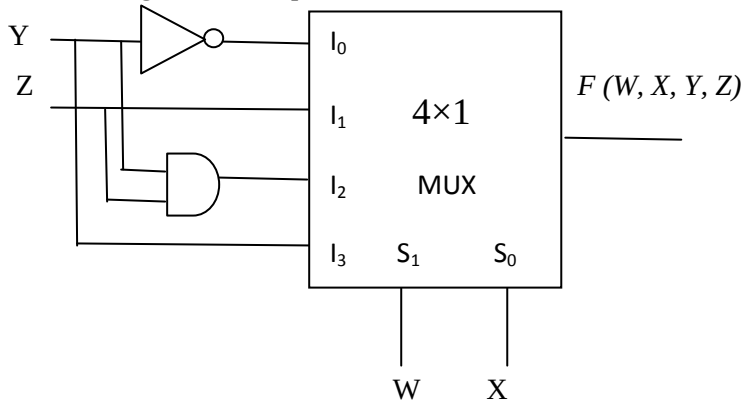
2. Simplify the Boolean function $F = \sum$ **m (0, 1, 5, 9, 13, 14, 15)** $+$ ***d(3, 4, 7, 10, 11)*** using K-map. [4]

3. The input to combinational logic circuit is a 4 bit binary number. Design the logic circuit with two outputs (Q1 and Q2) for the following conditions [5]
   a. Q1=1 if the input binary number is 5 or less than 5.
   b. Q2=0 if input number is 9 or more than 9.

4. Consider the following 4 × 1 multiplexer: [3]



   What is the Boolean function ***F*** in sum of minterms form?

5. A combinational circuit is defined by the functions $F_1(A, B, C) = \sum (1, 2, 4)$ *and* $F_2(A, B, C) = (1, 3, 7)$. Implement the circuit using PLA. [3]

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