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| --- | --- | --- |
| 1a) | Perform BCD addition on the following numbers  184 and 576 | 4 |
| b) | Convert the binary number 11011.0101 to decimal. Show your steps | 4 |
| c) | Convert the following two decimal numbers in binary and perform addition.  (-12) and (-14) | 5 |
| 2a) | The following number is written weighted format (8, 4, -2, -1)  1001  What is the number in decimal format? | 2 |
| b) | Design a BCD to 8, 4, -2, -1 converter. Show all steps. | 7 |
| c) | Determine the base of the numbers in each case for the following operations to be correct:  54/4 = 13 | 3 |
| 3a) | Express the following function as a sum of minterms  F = A + B’C  and as a product of maxterms  F = xy + x’z | 3+3 |
| b) | For a given Boolean function F(w, x, y, z) = ∑(1,3,7,11,15) which has the don’t care conditions d(w, x, y, z) = ∑(0,2,5)  a) Simplify the Boolean expression  b) Implement the circuit of a) with only NAND gates. | 4+3 |
| 4a) | Design odd parity generator circuit for 3 bit message. | 5 |
| b) | Simplify (without K-map) to two literals: ABC’D +A’BD + ABCD | 5 |
| 5a) | Consider the following logical statement and implement it into a digital circuit.  *if (x>y)*  *Sum = x+y*  *else*  *Sum = x-y*  Here, X and Y are 1 bit data. Sum is 1 bit result. (You can ignore carry here.) | 7 |
| 5b) | Design a 2 bit comparator circuit. | 5 |

**North South University**

Department of Computer Science and Engineering

**Midterm,** Spring 2017

Course No: **CSE231** Course Title: **Digital Logic Design**

Time: 1 h 15 min Full Marks: 60