

Mandan Bhandari Memorial College

Subject: Digital Logic

Department: CsIT

Exam time: 3 hours

Full marks: 60

Pass marks: 24

1. Subtract the following using 9's complement. (2 marks)
 $72532_{10} - 3250_{10}$
2. Convert the following. (1.5 * 2 = 3 marks)
 - a. $(10110)_2 = (?)_{\text{Gray}}$
 - b. $(1573)_8 = (?)_{16}$
3. How to find the complement of a given function? Explain with examples. (4 marks)
4. Prove the given Boolean function. (2 marks)
 $A'BC + AB'C + ABC' + ABC = AB + BC + CA$
5. What do you mean by universal gate? Show that NAND and NOR are universal gate. (5 marks)
6. Use K-map to simplify the given function in POS. Implement the simplified function using 2-input NOR gate only. (5 marks)
 $F = \prod M(0,1,2,9,10,11,14)$ and with don't care conditions
 $D = \prod M(7,8,12)$
7. Design an odd parity generator and parity checker for 3-bit input system. (5 marks)
8. Design and Explain 4-bit Adder-Subtractor. (5 marks)
9. Design a priority encoder and explain why we need it over encoder. (5 marks)
10. Design a circuit that produces the square of the three bit number using ROM. (4 marks)
Attempt any two (2*10 = 20)
11. Design a BCD adder that adds up two decimal number.
12. Design a BCD to Excess-3 code converter.
13. Implement the following function $F = \sum(0,1,3,4,7)$ using
 - a. Decoder
 - b. Multiplexer
 - c. PLA