Mechi Multiple Campus

B_{SC}CSIT First Semester

CSC111-Digital Logic

***First Terminal Examination* 2075 PM: 24 FM: 60 Time: 3 Hrs**

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

Attempt any <u>TWO</u> Questions. **[2*10=20]**

1.

a) Draw a logic symbol, truth table, and circuit diagram (***NAND only***) for the Half Adder. **[5]**

b) Write the Functional expression, truth table and circuit implementation of Full Adder. **[5]**

2. Minimize the following Boolean functions using K-map.

a) F(w, x, y, z)= $\sum(0, 1, 2, 9, 11, 15) + D(8, 10, 14)$ **[5]**

b) $(w+\bar{x} + y + \bar{z}).(w + x + y + z).(w + \bar{x} + \bar{y} + z).(\overline{w} + \bar{x} + z)$ **[5]**

3.

a) Define combinational circuit. Write the complete steps for the design procedures of a combinational logic circuit. **[1+4]**

b) Implement each expression with NAND logic using appropriate dual symbols. **[5]**

a) ABC+DEF b) WX+$\bar{Y}$+$\bar{Z}$

Group "B"

Attempt any <u>EIGHT</u> Questions.

4. What is meant by digital system? Distinguish between Analog signal and digital signal giving examples. **[1+4]**

5. State De Morgan's Law. Expand it for 3 variables and prove using the truth table. **[2+1+2]**

6. Perform the following operations:

a. $(1001001.011)_2$= $(?)_8$= $(?)_{10}$= $(?)_{16}$ **[3]**

b. Subtract 65 from 40 using 2's complement method. **[2]**

7. Reduce the given expression to a minimum number of literals using Boolean algebra rules, implement both sides using circuit diagram and verify using truth table. $[A\bar{B}\ (C + BD) + \overline{A}\ \overline{B}\ ]C$ **[5]**

8. Why NAND and NOR gates are called Universal gates. Show that all basic gates (NOT, OR, AND) can be realized. **[1+4]**

9. Explain XOR and XNOR gates with functional expression, digital symbol, truth table and timing diagram. **[5]**

10. What is meant by canonical form? Express the Boolean Function F=A+$\bar{B}$C in a sum of minterms. **[5]**

11. Add the following BCD numbers:

a) 1001+0101 **b)** 00010110+00010101 **[5]**

12. Write short notes on:

a) Excess-3 code **b)** Error Detection code **c)** signed Binary numbers **[5]**

~~~Best of Luck~~~