SUBJECT: Digital System Design **DEPT. CODE: CS 2001**
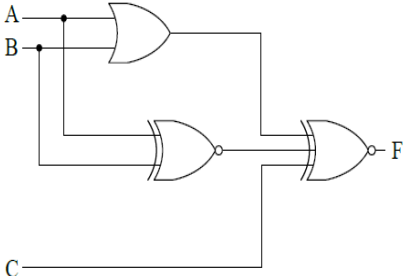
FULL MARKS: 30 **Duration of Examination: 2Hours**

Number of pages: 1

Answer **Any FIVE.** Figures at the right hand margin indicate marks

All parts of a question should be answered at one place

Q.No.	Question	Marks
1	**(a)** Implement the function **F (A, B, C, D) = Σ (1, 3, 4, 11, 12, 13, 14, 15)** using an 8 X 1 multiplexer. **(b)** What is the minimum number of 2 input NAND gates required to implement the function $F = (X' + Y')(Z + W)$? **(c)** Show that **(X + Y' + XY)(X + Y')(X'Y) = 0**	[3+2+1]
2	**(a)** Design an Octal to Binary Encoder. **(b)** Find the octal equivalent of **(378.93)$_{10}$**	[4+2]
3	**(a)** What do you mean by race around condition? How to deal with it? **(b)** Convert **F = A (B + C')** to Maxterms. **(c)** A locker has been rented in the bank. Express the process of opening the locker in terms of digital operation.	[2+2+2]
4.	**(a)** What will be the input combination for the output F to be 1 in the logic circuit shown below? Justify your answer. **(b)** State the limitations of Karnaugh map. **(c)** Explain address and word in association with ROM with a diagram.	[2+2+2]
5	**(a)** Design a 2-bit Magnitude Comparator. **(b)** Convert **(A0F9.0EB)$_{16}$** to decimal.	[4+2]
6.	**(a)** Given the two binary numbers X = 1010100 and Y = 1000011, perform the subtraction of (a) X-Y and (b) Y - X using 2's complements. **(b)** A Boolean function f of two variables X and Y is defined as follows: f(0, 0) = f(0, 1) = f(1, 1) = 1; f(1, 0) = 0 Assuming complements of X and Y are not available, Find the minimum cost solution for realizing using only 2-input NOR gates and 2-input OR gates (each having cost=1). What would have the total cost?	[3+3]