2123
B. E. (Information Technology)
Third Semester
ESC-301: Digital Electronics

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

   a) A 30:1 Multiplexer will have....... Select lines. Explain your answer.

   b) Prove $x \oplus x = 0$

   c) What is the minimum number of NAND gates required to implement $A+A'B+AB'C$? Why?

   d) Subtract: 110011001-10111101

   e) Determine the base x: $(211)x = (152)8$ (5x2)

UNIT - I

II. Solve the following using K-Map: $Y(A,B,C,D) = \Sigma\, m(2,3,5,7,8,9,12,13,15)$. (10)

III. Design a decade synchronous counter which counts in 6-3-1-1 code sequence using T flip flops. {Note: To construct the code, always allot logic '1' to LSB in case of conflict} (10)

IV. a) A digital comparator compares two numbers A and B. Each of A and B is 2 bit. Write the truth table to compare the numbers A and B; where A = A1A0 and B is B1 and B0

   b) What is a Universal Shift Register? (2x5)

UNIT - II

V. Explain the working of a Successive Approximation (SAR) ADC with the help of necessary diagrams and examples. (10)

P.T.O.

VI. a) Draw and explain the working of MOS inverter and CMOS inverter.

b) Draw a nMOS NOR Gate.   (2x5)

VII. a) If a memory is having 14 address lines and 10 data lines, then calculate the number of memory locations and the word length.

b) Find all the equivalent states using Implication Table

Present State	Next State		Output(Y)	
	X=0	X=1	X=0	X=1
a	a	b	0	0
b	c	d	0	0
c	a	d	0	1
d	e	f	0	0
e	a	f	0	1
f	a	f	0	1
g	a	f	0	1

(2x5)

x-x-x