Exam. Code: 0929

Sub. Code: 6913

## 1078

## B. Engg. (Electronics & Comm. Engg.) 5<sup>th</sup> Semester

EC-505: Digital System Design

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt <u>five</u> questions in all, including Q. No. 1 which is compulsory and selecting atleast two questions from each Unit.

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I. Attempt the following: -

(a) What are the limitations of K-map?

- (b) Which rows and columns can be removed while drawing the reduced prime implicant chart?
- (c) How are Hamming code works formed?

(d) What are distinguishable states?

(e) What are the limitations of path-sensitizing fault-detection method?  $(5\times2)$ 

## **UNIT-I**

II. (a) Reduce the following expression to the simplest possible POS form:  $f = \sum m(6,9,13,18,19,25,27,29,31) + d(2,3,11,15,17,24,28)$ 

(b) Obtain the prime implicants of the following expression using tabular iterative-consenous method:

$$f = \overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}CD + A\overline{B}C\overline{D} + A\overline{B}CD + \overline{A}BCD + \overline{A}B\overline{C}D + AB\overline{C}D + AB\overline{C}D$$
(5+5)

III. Minimize the following multiple output functions using tabulation method:

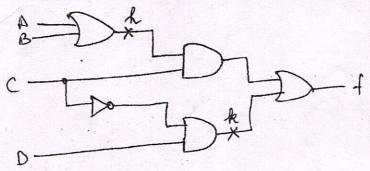
$$F_1 = \sum m(1,2,5,6,8,9,10)$$

$$F_2 = \sum m(2,4,6,8,10,12,15)$$

(10)

IV. (a) Given the 8-bit data word 10111001, generate 12-bit composite word for the Hamming code that corrects and detects single errors.

(b) Find tests to detect the faults h s-a-o and h s-a-1, k s-a-0 and k s-a-1.

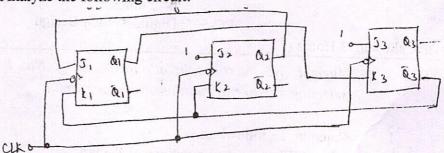


(5+5)

P.T.O.

## **UNIT-II**

V. (a) Analyze the following circuit:



(b) Construct the compatibility graph and obtain the minimal cover table for the sequential machine given in table:

PS	NS, Z	
	$I_1$	$I_2$
Α	<u></u> -	F,0
В	B,0	C,0
C	E,0	A,1
D	B,0	D,0
E	F,1	D,0
F	A,0	100

(5+5)

VI. A clocked sequential circuit is provided with a single input x and a single output z. Whenever the input produces a string of pulses 111 or 000 and at the end of the sequence, it produces an output z=1 and overlapping is allowed. Design the sequence detector. (10)

VII. The value of the output z of a fundamental mode two-input sequential circuit is to change from 0 to 1 only when the value of x<sub>2</sub> changes from 0 to 1 while x1=1. The output value is to change from 1 to 0 only when the value of x<sub>1</sub> changes from 1 to 0 while x<sub>2</sub>=1. Find a minimum-row reduced flow table. The output should be fast and flicker-free. Show a valid assignment and write a set of hazard-free excitation and output equations.

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