

CBCS Scheme



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15EC552

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018 Switching and Finite Automata Theory

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Discuss the following :
 i) Threshold element
 ii) Admissible pattern. (08 Marks)
- b. Show that a threshold logic realization of a full adder requires only two threshold elements. (Note: both sum and carryout must be generated). (08 Marks)

OR

- 2 a. By examining the linear inequalities, determine which of the following functions is a threshold function, and for each one that is, find the corresponding weight – threshold vector.
 i) $f_1(x_1, x_2, x_3) = \Sigma(1, 2, 3, 7)$
 ii) $f_2(x_1, x_2, x_3) = \Sigma(0, 2, 4, 5, 6)$
 iii) $f_3(x_1, x_2, x_3) = \Sigma(0, 3, 5, 6)$ (10 Marks)
- b. Explain the concept of Geometrical representation with an example. (06 Marks)

Module-2

- 3 a. Write a note on :
 i) Preset experiments
 ii) Adaptive experiments. (08 Marks)
- b. For the circuit of Fig. Q3 (b), find all tests to detect the faults x_3 , $S - a - 0$ and $S - a - 1$.

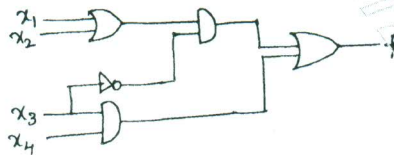
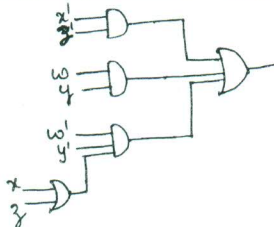


Fig Q.3(b)

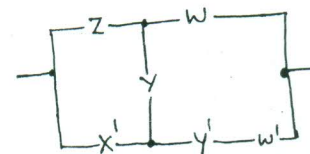
(08 Marks)

OR

- 4 a. Explain Fault detection of path sensitizing and list its limitation. (08 Marks)
- b. Analyse each of the circuits shown in Fig. Q4 (b) i and ii for static hazards. Redesign each circuit so that it becomes hazard – free.



i)



ii)

Fig. Q4(b)

(08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. What are compatible states? For the tabular column Table Q5(a), shown machine 'M', find the augmented machine and corresponding minimal machines.

PS	NS, Z	
	X = 0	X = 1
A	A, 0	C, 0
B	B, 0	B, -
C	B, 0	A, 1

Table Q5 (a) M

(10 Marks)
(06 Marks)

- b. Discuss closed set of compatibility.

OR

- 6 a. What is merger graph? Draw the merger graph for the incompletely specified machine M_1 shown in Table Q6 (a).

PS	NS, Z			
	I_1	I_2	I_3	I_4
A	-	C, 1	E, 1	B, 1
B	E, 0	-	-	-
C	F, 0	F, 1	-	-
D	-	-	B, 1	-
E	-	F, 0	A, 0	D, 1
F	C, 0	-	B, 0	C, 1

Table Q6 (a) M_1

(10 Marks)

- b. Prove the following theorem :

- i) The equivalence partition is unique
- ii) If two states, S_i and S_j of machine M are distinguishable, then they are distinguishable by a sequence of length $n - 1$ or less, where n is the number of states in M .

(06 Marks)

Module-4

- 7 a. Given the machine table in Table Q7(a) M_2 and two assignments α and β , derive in each case the logical equations for the state variables and the output function.

	NS		Z	
	X = 0	X = 1	X = 0	X = 1
A	D	C	0	0
B	F	C	0	1
C	E	B	0	0
D	B	E	1	0
E	A	D	1	1
F	C	D	1	0

Table Q7(a), M_2

	y_1	y_2	y_3		y_1	y_2	y_3
A \rightarrow	0	0	0	A \rightarrow	1	1	0
B \rightarrow	0	0	1	B \rightarrow	1	0	1
C \rightarrow	0	1	0	C \rightarrow	1	0	0
D \rightarrow	0	1	1	D \rightarrow	0	0	0
E \rightarrow	1	0	0	E \rightarrow	0	0	1
F \rightarrow	1	0	1	F \rightarrow	0	1	0

Assignment α

Assignment β

(10 Marks)

- b. Explain the lattice of closed partitions.

(06 Marks)

OR

- 8 a. Construct the π - lattice for the machine M_3 shown in Table Q8(a)

PS	NS	
	X = 0	X = 1
A	E	B
B	E	A
C	D	A
D	C	F
E	F	C
F	E	C

Table Q8(a), M_3

(10 Marks)

- b. Explain the following:
- Covers
 - The implication graph.

(06 Marks)

Module-5

- 9 a. Draw the homing tree and synchronizing tree of machine M_4 shown in Table Q9 (a) and explain it.

PS	NS, Z	
	X = 0	X = 1
A	B, 0	D, 0
B	A, 0	B, 0
C	D, 1	A, 0
D	D, 1	C, 0

Table Q9(a), M_4

(10 Marks)

- b. Write a note on :
- Distinguishing tree
 - Adaptive distinguishing experiments

(06 Marks)

OR

- 10 a. What is diagnosable sequence machine? Construct testing table and graph for machine shown in Table Q10 (a).

PS	NS, Z	
	X = 0	X = 1
A	B, 0	D, 0
B	A, 0	B, 0
C	D, 1	A, 0
D	D, 1	C, 0

Table Q10(a)

(10 Marks)

- b. List the general procedure in second algorithm for the design of fault detection experiments.

(06 Marks)

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