Code No: I6801/R16

M.Tech. I Semester Regular Examinations, January-2017

DIGITAL SYSTEM DESIGN

[Common to VLSI&ES (68), ES&VLSI (48), VLSID &ES (77), ES &VLSID (81), VLSI (57), VLSID (72), VLSI System Design (61), VLSI & Micro Electronics (76), Embedded Systems (55) DECS (38), ECE (70), DECE (37), C&CE (49),C&C (39)and Instrumentation And Control Systems (27)]

Time: 3 Hours **Max. Marks: 60**

Answer any FIVE Questions
All Questions Carry Equal Marks

1. a Obtain the minimal expression using the tabular method and implement it in universal logic 8M
   $F = \sum m(0, 1, 3, 4, 5, 7, 10, 13, 14, 15)$
   b What is a K-map? What are its advantages and disadvantages? 4M

2. a Explain the PLA design for the following f = x'y'z + x'yz + xyz + xy'z'. 8M
   b Compare ROM, PLA and PAL with respect to all features, programming aspects and applications. 4M

3. a Draw an ASM chart to design the control logic of a binary multiplier. Realize the design on PLA and use any other required flip-flops and logic. 12M

4. a A two level AND-OR circuit has four AND gates feeding one OR gate. The four AND gates realize the product terms $x_1x_3'x_4$, x_2x_4, $x_1'x_3'x_4'$ and $x_1x_2x_3$ respectively. Derive the a-test and b - test for detecting multiple stuck-at faults. 6M
   b Draw the 3-bit parity checker circuit. Using the path-sensitization method, find the test vectors for SA0 and SA1 faults on each line of the circuit. 6M

5. a Determine the distinguishing sequence for the following machine M by conducting adaptive distinguishing experiment. 8M

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

   b With suitable example explain how to construct homing tree. 4M

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6. a Write the steps in the minimization using the tabular method? 6M
   b With the help of maps, determine if the cubes 6M
      i) 2122
      ii) 1001
      iii) 2221
      iv) 1212 are wholly within the function
   f= 0112 + 1002 + 1221 + 2112

7. Find the simple column folding of the SSR table of a PLA. Draw the folded PLA. 12M

Columns	**SSR**
A	3,6,8
B	1,2,4,5,9,11
C	1,3,6,7,9,10
D	2,5,7,8,12
E	1,3,6,11
F	4,6,7,8,10
G	1,3,5,7,9
H	6,8,12

8. a Briefly discuss about fault diagnosis and testing with flow diagram. 6M
   b Find out shortest homing sequence for a given machine. 6M

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

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