Name :

Number :

CME2003 LOGIC DESIGN

MAKEUP EXAM (20.01.2015)

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| ( 25 ) | **1** | The following boolean function (with its don't cares) is given:  **F (A,B,C,D) = Σm (6, 7, 11, 12,13, 15) d (A,B,C,D) = Σm (1,3, 4, 9, 14)**   1. Find both minimum sum of products and minimum product of sums expressions using Karnaugh map simplification method. 2. Draw the combinational circuit for the simplest function using only NOR gates. 3. This function can be implemented by using a 4-to-1 multiplexer? Show the circuit if it is possible. 4. Is it possible to implement the function above if we have only 2 X 4 decoders and OR gates? |
| (5) | **2** | Convert BCD 0101 0011 1001 to binary and Gray Code.. |
| (10) | **3** | Using Boolean Algebra find the simplest form of the expression |
| ( 5 ) | **4** | Draw the timing diagram and explain the function of the circuit.        **B**    **F** |
| (15) | **5** | Find single precision floating point number for the following **signed** hexadecimal value: **F86D00** |
| (20) | **6** | 1. Using JK flip flops design a counter to produce following sequence: 6 3 0 1. *(Give only the expressions for the J and K inputs. No need to draw the circuit.)* 2. Determine the behavior of the circuit in the case of entering unused states. |
| ( 25 ) | **7** | Design a synchronous state machine with the state/output table shown in following table, using D flip-flops. Use two state variables, Q1 Q0 with the state assignment A= 01, B=11, C=10.  Draw the chart and state diagram. Is it Moore or Mealy type? Explain.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Present State  (Q1 Q0) | Next State (Q1+ Q0+) | | Output  (Z) | | | X=0 | X=1 | X=0 | X=1 | | A | C | A | 0 | 0 | | B | A | C | 0 | 1 | | C | B | A | 1 | 0 | |
| (10) | **8** | Design D/A converter for the following conversion table.    Digital Analog to Analog Converter:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Digital Input (2 bits) | 000 | 001 | 010 | 011 | 100 | 101 | 110 | 111 | | Analog Output(V) | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | |
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