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Roll No

MEDI/MTEL/MTDE - 201

M.E./M.Tech., II Semester

Examination, December 2015

Electronics System Design

Time : Three Hours

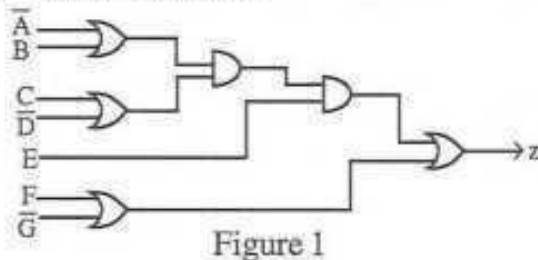
Maximum Marks : 70

Note : i) Attempt any five questions.

ii) All questions carry equal marks.

- a) Explain the essential features of VHDL and write a VHDL program for active 4:16 decodes.
- b) Implement the following function using multiplexer :
$$F(x, y, z) = \sum_m (0, 3, 5, 6)$$

2. a) Convert the gate network shown in figure 1 :
i) All NAND network
ii) All NOR network



- b) Design a BCD to excess - 3 code converter.
3. a) Design a modulo-5 counter using J-k flipflop.
b) With the help of circuit diagram explain the working of J-K flip flop. Also draw the timing and state diagram.
4. a) What is race around condition? How it can be eliminated?
b) Explain lock out condition in counter with example.

5. Perform state reduction of state table in Table-1 consider state table for Mealy Model sequential circuit-1.

Table-1-state table for Mealy Model sequential circuit-1.

Present state	Next state after transition ($\theta'_1, \theta'_2, \theta'_3$)		Present O/P Y	
	I/P X=0	I/P X=1	I/P X=0	I/P X=1
S_1	S_2	S_1	1	1
S_2	S_1	S_3	0	1
S_3	S_4	S_1	1	1
S_4	S_4	S_5	0	1
S_5	S_3	S_4	0	0

6. a) What is the merger graph? What is the closed sets of compatibles?
b) Explain when does two machines M_1 and M_2 are said to be equivalent. Explain with an example.
7. Design an asynchronous sequential circuit with two inputs x_1 and x_2 and two outputs G and R, which is to behave in the following manner. Initially both inputs and both outputs are equal to 0. Whenever $G = 0$ and either x_1 or x_2 becomes 1, G turns 'on' (i.e. become 1). When the second input becomes 1, and turns 'on'. The first input that changes from 1 to 0 turns G 'off'. R turns off when G is off and either input changes from 1 to 0.
8. Write short notes on any two of the following :
 - a) Moore Machine
 - b) Path sensitizing
 - c) Circuits with free structures