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Total No. of Questions—8]

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Seat No.	
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S.E. (Computer Engineering)

EXAMINATION, 2014

DIGITAL ELECTRONICS AND LOGIC DESIGN

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Attempt Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4,
Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.

(ii) Figures to the right indicate full marks.

(iii) Assume suitable data, if necessary.

1. (a) Do the following conversions : [6]

(i) $(1011.01)_2 \rightarrow ()_{10}$

(ii) $(4C8.2)_{16} \rightarrow ()_{10}$

(iii) $(0.6234)_{10} \rightarrow ()_8$

(b) What is logic family ? Give the classification of logic family. [3]

(c) Explain the wired logic output of TTL with neat diagram. [3]

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Or

2. (a) Minimize the following expression using Quine-McClusky : [6]

$$F(A, B, C, D) = \sum m (1, 5, 6, 12, 13, 14) + d(2, 4)$$

- (b) Explain with diagram 2 input CMOS NAND gate. [6]

3. (a) What do you mean by half adder and full adder ? How will you implement full adder using half adder ? Draw the circuit diagram. [6]

- (b) Explain with neat diagram working of parallel in serial out 4-bit shift register. Draw necessary timing diagram. [6]

Or

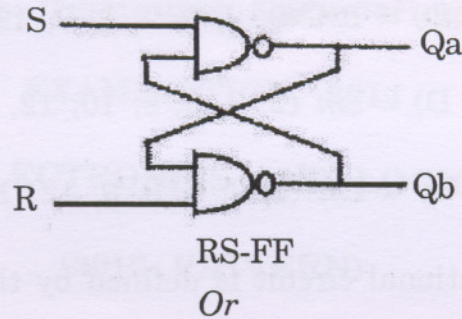
4. (a) Explain in detail Look Ahead Carry generator. [6]

- (b) Design a MOD-5 synchronous counter using JK FF and implement it. Also draw timing diagram. [6]

5. (a) Draw the ASM chart for the following state machine. A 2-bit up counter is to be designed with output Q, Q0, and enable signal 'X'. If $X = 0$, then counter changes the state as 00 – 01 – 10 – 11 – 00. If $X = 1$ then counter remains in same state.

Design the circuit using JK-FF and suitable MUX. [7]

- (b) What is meant by Entity and Architecture in VHDL ? Write the architecture of RS FF as given below in structural modeling. Assume entity NAND 2 A, B input and Y output. [6]



- (a) Write VHDL code for 2-bit comparator circuit. Use behavioural modeling style. [6]

- (b) Draw an ASM chart and state table for a 2-bit Up-Down counter having mode control input M

When $M = 1$: UP counting

When $M = 0$: Down Counting

The circuit should generate output whenever counter becomes minimum or maximum. [7]

7. (a) What do you mean by FPGA ? Explain the internal architecture of FPGA. State the importance of configurable logic block in FPGA. [7]

- (b) What is PLA ? Explain the input buffer AND and OR Matrix in PLA. [6]

Or

8. (a) Implement the following Boolean function using PAL : [7]

$$W(A, B, C, D) = \Sigma m (0, 2, 6, 7, 8, 9, 12, 13)$$

$$x(A, B, C, D) = \Sigma m (0, 2, 6, 7, 8, 9, 12, 13, 14)$$

$$y(A, B, C, D) = \Sigma m (2, 3, 8, 9, 10, 12, 13)$$

$$z(A, B, C, D) = \Sigma m (1, 3, 4, 6, 9, 12, 14)$$

- (b) A combinational circuit is defined by the function : [6]

$$F1 = \Sigma m(3, 5, 7)$$

$$F2 = \Sigma m(4, 5, 7)$$

Implement the circuit with PLA having 3 input and 3 product term with 2 output.