

Code No: 07A3EC16

**R07****Set No. 2**

II B.Tech I Semester Examinations, May 2011

**DIGITAL LOGIC DESIGN**Common to Information Technology, Computer Science And Engineering,  
Computer Science And Systems Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
All Questions carry equal marks

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1. Explain about the two ways to achieve a BCD Counter using a Counter with Parallel Load? [16]
2. (a) Design a circuit with four inputs and one output where the output is 1 if the input is divisible by 3 or 7.  
(b) A safe has 5 locks: v, w, x, y, all of which must be unlocked for the safe to open. The keys to the locks are distributed among five executives in the following manner: Mr.A has keys for locks v & x  
Mr.B has keys for locks v & y  
Mr.C has keys for locks w & y  
Mr.D has keys for locks x & z  
Mr.E has keys for locks w & z
  - i. Determine the minimal no. of executives required to open the safe.
  - ii. Find all the combinations of executives that can open the safe, write an expression  $f(A, B, C, D, E)$  which specifies when the safe can be opened as a function of which executives are present
  - iii. Who is the 'essential executive' without whom the safe cannot be opened. [7+9]
3. Explain about the following:
  - (a) Merger diagrams
  - (b) Flow and implication tables. [16]
4. (a) Implement Half adder using 4 NAND gates.  
(b) Implement full subtractor using NAND gates only. [6+10]
5. (a) design a 2 bit comparator using gates.  
(b) Use an 8-to-1 MUX to design the following combinational logic circuit There are four adjacent parking slots in the XYZ Inc executive parking area. Each slot is equipped with a special sensor whose output is asserted high when a car is occupying the slot. Design a decoding system that will signal the existence of two or more adjacent vacant slots. [10+6]

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6. Tabulate the truth table for an 8 X 4 ROM that implements the Boolean functions

$$A(x,y,z) = \sum(1,2,4,6)$$

$$B(x,y,z) = \sum(0,1,6,7)$$

$$C(x,y,z) = \sum(2,6)$$

$$D(x,y,z) = \sum(1,2,3,5,7)$$

Considering now the ROM as a memory, specify the memory contents at addresses 1 and 4? [16]

7. (a) What is the gray code equivalent of the Hex Number 3A7  
(b) Find the biquinary of number code for the decimal numbers from 0 to 9  
(c) Find 9's complement  $(25.639)_{10}$   
(d) Find  $(72532 \ 03250)$  using 9's complement. [4+4+4+4]
8. Explain about HDL for Sequential Circuits in Detail? [16]

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FIRSTRANKER

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**R07****Set No. 4**

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6. (a) design a 2 bit comparator using gates.  
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$$D(x,y,z) = \sum(1,2,3,5,7)$$
 Considering now the ROM as a memory, specify the memory contents at addresses 1 and 4? [16]
8. (a) Design a circuit with four inputs and one output where the output is 1 if the input is divisible by 3 or 7.

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Set No. 4

- (b) A safe has 5 locks: v, w, x, y, all of which must be unlocked for the safe to open. The keys to the locks are distributed among five executives in the following manner:
- Mr. A has keys for locks v & x
  - Mr. B has keys for locks v & y
  - Mr. C has keys for locks w & y
  - Mr. D has keys for locks x & z
  - Mr. E has keys for locks v & z
- i. Determine the minimal no. of executives required to open the safe.
  - ii. Find all the combinations of executives that can open the safe, write an expression  $f(A, B, C, D, E)$  which specifies when the safe can be opened as a function of which executives are present
  - iii. Who is the 'essential executive' without whom the safe cannot be opened. [7+9]

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**R07****Set No. 1**

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1. Explain about the following:

- (a) Merger diagrams
- (b) Flow and implication tables. [16]

2. Tabulate the truth table for an 8 X 4 ROM that implements the Boolean functions

$$A(x,y,z) = \sum(1,2,4,6)$$

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Considering now the ROM as a memory, specify the memory contents at addresses 1 and 4? [16]

- 3. (a) Implement Half adder using 4 NAND gates.
- (b) Implement full subtractor using NAND gates only. [6+10]

- 4. (a) design a 2 bit comparator using gates.
- (b) Use an 8-to-1 MUX to design the following combinational logic circuit There are four adjacent parking slots in the XYZ Inc executive parking area. Each slot is equipped with a special sensor whose output is asserted high when a car is occupying the slot. Design a decoding system that will signal the existence of two or more adjacent vacant slots. [10+6]

- 5. (a) Design a circuit with four inputs and one output where the output is 1 if the input is divisible by 3 or 7.

- (b) A safe has 5 locks: v,w,x,y, all of which must be unlocked for the safe to open. The keys to the locks are distributed among five executives in the following manner:
  - Mr.A has keys for locks v& x
  - Mr.B has keys for locks v& y
  - Mr.C has keys for locks w& y
  - Mr.D has keys for locks x& z
  - Mr.E has keys for locks v& z

- i. Determine the minimal no. of executives required to open the safe.

- ii. Find all the combinations of executives that can open the safe, write an expression  $f(A,B,C,D,E)$  which specifies when the safe can be opened as a function of which executives are present

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- iii. Who is the 'essential executive' without whom the safe cannot be opened.  
[7+9]
6. Explain about the two ways to achieve a BCD Counter using a Counter with Parallel Load? [16]
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8. Explain about HDL for Sequential Circuits in Detail? [16]

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  - iii. Who is the 'essential executive' without whom the safe cannot be opened. [7+9]

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6. Explain about the following:
- (a) Merger diagrams
  - (b) Flow and implication tables. [16]
7. Explain about HDL for Sequential Circuits in Detail? [16]
8. (a) design a 2 bit comparator using gates.
- (b) Use an 8-to-1 MUX to design the following combinational logic circuit There are four adjacent parking slots in the XYZ Inc executive parking area. Each slot is equipped with a special sensor whose output is asserted high when a car is occupying the slot. Design a decoding system that will signal the existence of two or more adjacent vacant slots. [10+6]

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