

**R15**

Code No: 123CT

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B.Tech II Year I Semester Examinations, November/December - 2016**

**DIGITAL LOGIC DESIGN**

(Computer Science and Engineering)

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A**

**(25 Marks)**

- 1.a) Explain duality theorem with example. [2]
- b) Convert following hexadecimal number to decimal.  
i)  $F28_{16}$  ii)  $BC2_{16}$ . [3]
- c) Implement Ex-NOR gate using only NAND gates. [2]
- d) Obtain the prime implicants for given Boolean expression using K-map.  
 $f(A, B, C) = \sum(1, 3, 6, 7)$ . [3]
- e) What is code converter? [2]
- f) Explain the analysis procedure for combinational circuit. [3]
- g) Explain clear and preset inputs. [2]
- h) What is race around condition? [3]
- i) Explain the role of Cache Memory in sequential circuits. [2]
- j) Compare ROM and RAM. [3]

**PART-B**

**(50 Marks)**

- 2.a) Using 2's complement perform  $(42)_{10} - (68)_{10}$ . [5+5]
- b) Implement the following Boolean function with NOR-NOR logic  
 $F(A, B, C) = \pi M(0, 2, 4, 5, 6)$ .

**OR**

- 3.a) What is the specialty of unit-distance code? State where they are used.
- b) Give the Boolean expressions used for following gates  
i) AND ii) NOR iii) EX-OR iv) OR v) EX-NOR. [5+5]

4. Reduce the following functions using K-map techniques.

a)  $f(A, B, C, D, E) = \sum m(1, 4, 8, 10, 11, 20, 22, 24, 25, 26) + d(0, 12, 16, 17)$

b)  $f(A, B, C, D) = \pi M(4, 5, 6, 7, 8, 12, 13) + d(1, 15)$ . [5+5]

**OR**

- 5.a) Using K-map obtain the minimal sum of products and the minimal product of sums from of the function  $f(a, b, c, d) = \sum m(1, 2, 3, 5, 6, 7, 8, 13)$ .

- b) Explain about essential prime implicants. [5+5]

6. Design the full adder circuit using decoder and de-multiplexer. [10]

**OR**

- 7.a) Write a short note on priority encoder.
- b) What is decoder? [5+5]

01 01 01 01 01 01 01

8.a) Compare combinational circuits and sequential circuits. 01 01 01  
b) Explain the clocked JK flip-flop with truth table. [5+5]

OR

9. Draw and explain the working of following flip-flops:  
a) RS b) D.

[5+5]

10.a) Draw and explain the block diagram of PLA. 01 01 01  
b) Explain address and data bus in digital electronics. [5+5]

OR

11. Implement the following function using a PROM.

a)  $F(A, B, C, D) = \sum m(1, 9, 12, 15)$   
b)  $G(A, B, C, D) = \sum m(0, 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15)$  [5+5] 01

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