Code No: 123CT **R15**

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

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]

8.a) Compare combinational circuits and sequential circuits.
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.
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]

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