# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD 

.... ...Tech II Year Hisemester Examinations, May - 2016 SWITCHING THEORY AND LOGIC DESIGN
(Electrical and Electronics Engineering)
Time: 3 Hours
Note: This question paper contains țwo parts A and B.
.... .... Part A is compulsory which earries 25 matks. 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 $\mathrm{a}, \mathrm{b}, \mathrm{c}$ as sub questions.

PART- A
1.a) What is Gray code?
b) How do you obtain dual of an expression?
c) What are don't cares?
d) What is minterm?
e) Compare combinational and sequential circuits.
f) Explain about binary cell.
g) What are the basic types of shift registers?
h) Compare asynchronous and synchronous counters.
i) Explain capabilities of finite state machine.
j) Explain concept of minimal cover table.
(25 Marks)

$\square$ (50.Marks)
2.a) Convert the given Gray code number to equivalent binary 001001011110010.
b) Convert (A0F9.0EB) $)_{16}$ to decimal, binary, octal.

## OR

3.a): Obtain dual of the following Boolean expressions
$\ldots \quad$ i) $A B+A(B+C)+B^{\prime}(B+D) \cdot \ldots$
ii) $A+B+A^{\prime} B^{\prime} C$.
b) Obtain the compliment of the following Boolean expressions
i) $\mathrm{A}^{\prime} \mathrm{B}+\mathrm{A}^{\prime} \mathrm{BC}^{\prime}+\mathrm{A}^{\prime} \mathrm{BCD}+\mathrm{A}^{\prime} \mathrm{BC}^{\prime} \mathrm{D}^{\prime} \mathrm{E}$
ii) $\mathrm{ABEF}+\mathrm{ABE}^{\prime} \mathrm{F}^{\prime}+\mathrm{A}^{\prime} \mathrm{B}^{\prime} E F$.
4.ä) Minimize the following expression using K-map and realize using NAND Gätes. $F(A, B, C, D)=\sum m(0,1,2,9,11)+d(8,10,14,15)$.
b) Minimize the following expression using K-map and realize using NOR Gates. $\mathrm{f}=\pi \mathrm{M}(0,4,6,7,8,12,13,14,15)$.

## OR

5, Explain the differences between a MUX and a DEMUX Realize 16-input multiplexer by cascading of two 8-input multiplexers 74151.
b) Realize the function $f(A, B, C, D)=\pi(1,4,6,10,14)+d(0,8,11,15)$ using:
i) 16:1 MUX
ii) $8: 1$ MUX.
-..6:a) What is meănt by 'edge triggered'? Differentiate SR-FF and JK-FF with their functional operation and excitation tables.
b) Draw and explain the circuit diagram of positive edge triggered J-K flip-flop using NOR gates with its truth table. How race around conditions are eliminated?
E.... Explain in detail about timing and triggering considerations sequential cirčuts:
8.a) Discuss about synchronous and ripple counters. Compare their merits and demerits.
b) What do you mean by éniversal shift register? Draw ánd explain its érccuit diagram and operation.

## OR

9.a) What is a shift register? Explain about the following modes of operations in a four bit shift register (i) shift right (ii) shift left (iii) bidirectional.
b) Explain the differences between ring and Johnson counters. Design and explain the operation of a decade Johhson counters.
10.a) What are the Moore and Melay machines? Compare them.
b) Explain the procedure for state minimization using the partition technique. [5+5] OR
11.a) Name the elements of an ASM chart and define each one of them.
(....b) Explain the control subsysten implementation of weighing machine.

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