Printed pages: 02 **Sub Code: NEC-304**

Paper Id: **130317** **Roll No.** | | | | | | | | | | |

B TECH
(SEM-III) THEORY EXAMINATION 2018-19
SWITCHING THEORY & LOGIC DESIGN

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a) What is race around condition in JK flip-flop?
b) Differentiate between EPROM and EEPROM.
c) Design full adder using two half adders.
d) Determine the value of base x if:
   (i) $(211)_x=(152)_8$
   (ii) $(193)_x=(623)_8$
e) What are hazards?
f) A logical expression in the standard SOP from is as under:

$$Y = \overline{A}\overline{B}\overline{C} + \overline{A}B\overline{C} + \overline{A}BC + A\overline{B}C$$

   Minimize it using the k-map technique.
g) Explain the difference between PLA and PAL.
h) Distinguish Encoder and Decoder?
i) How is the capacity of a PLA specified?
j) Differentiate between multiplexer and demultiplexer.

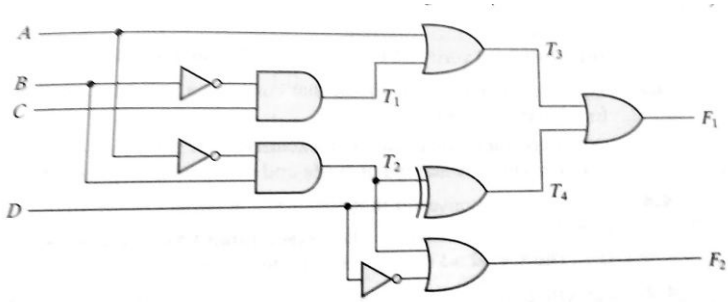
SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a) Minimize the following logic function k-map and verify the answer using the Quine-Mc-cluskymethod Y(A,B,C,D)=ΣM(0,1,2,3,6,7,8,10,12,13)

b) What is multiplexer? Design 16:1 multiplexer using 4:1 multiplexer?

c) Consider the combinational circuit shown in figure



(i) Derive the Boolean expression for T_1 to T_4. Evaluate the output F_1 and F_2.
(ii) Derive the truth table with 16 binary combination of the four input variable.

d) Convert a D flip flop into (i) T-flip flop (ii) JK flip flop?

e) What do you mean by hazard? Give the classification and Explain in detail.

SECTION C

3. Attempt any *one* part of the following: 10x 1 = 10

a) Simplify the given function using k-map

$F(a,b,c,d) = \Sigma(0,1,3,4,6,8,10,11)$

b) Generate the 7-bit hamming code for given data 1011.

4. Attempt any *one* part of the following: 10x 1 = 10

a) Construct a BCD to excess 3 code converter with a 4-bit adder. What must be done to change the circuit to an excess 3 to BCD code converter?

b) What is magnitude comparator? Design a three-bit comparator circuit using logic gates.

5. Attempt any *one* part of the following: 10x 1 = 10

a) Differentiate between asynchronous counter and synchronous counter? Design and implement Two-Bit-Ripple up-counter using positive edge-triggered J-K Flip-flop.

b) Differentiate between Flip flop and latch? Convert SR Flip flop in to D flip flop.

6. Attempt any *one* part of the following: 10x 1 = 10

a) Differentiate between asynchronous and synchronous sequential circuit.Also design MOD 5 asynchronous counter using JK flip flop.

b) Write short notes on any two of the following

(i) Critical and non critical race

(ii) Cycle

(iii) Debounce circuit

7. Attempt any *one* part of the following: 10x 1 = 10

a) Implement the following function using PLA.

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

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

$C(x,y,z)=\Sigma m(2,6)$.

b) Discuss the different types of RAM and ROM?