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

Time: 3 Hours   *Total Marks: 100*

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

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

   a) What are the merits of hamming codes?

   b) Find the 'x' base of $(211)_x = (152)_8$?

   c) Distinguish Encoder and Decoder?

   d) What are the applications of Multiplexer?

   e) What is the programmable table of PLA?

   f) Why is a shift register restrictive?

   g) How is the capacity of a PLA specified?

   h) How many flip flop will be complemented in an 8-bit ripple counter to reach the next count after the following count 10110111?

   i) What is race around condition in JK flip-flop?

   j) What is race condition in asynchronous sequential Circuits?

SECTION B

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

   a) Reduce the Boolean expression-

   $(i) ABC[AB + \overline{C}(BC + AC)]$

   $(ii) \overline{A}\overline{B}\overline{C} + \overline{A}B\overline{C} + A\overline{B}\overline{C} + AB\overline{C}$

   b) Design a logic circuit to generate even parity bit?

   c) Explain ROM and discuss their advantage and disadvantage?

   d) Write the design steps of synchronous counter?

   e) Discuss the analysis procedure of asynchronous sequential Circuits?

SECTION C

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

   a) Minimize & implement the following multiple output function in SOP using K-map

   $f = \sum m(0,2,3,4,7,9,15) + d(6,8,11)$

   b) Obtain the set of prime implicants for the Boolean expression $f = \sum m(0,1,6,7,8,9,13,14,15)$ using tabular method.

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

   a) Write the program table to implement a BCD to excess-3 code?

   b) Discuss the comparison among PROM, PLA and PAL?

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

   a) Implement a full adder using 3-line to 8line decoder?

   b) What is Hazards? Discuss its types and hazard free realization?

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

   a) Convert an SR flip flop into (i) T-flip flop (ii) JK flip flop?
   b) Discuss the application of Shift register?

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

   a) Find a circuitthat has no Static hazards and implements the Boolean function
     F (A, B. C, D) = (0, 2, 6. 7, 8. 10. 12)
   b) The Boolean functions for the inputs of an SR latch are

$$s = \overline{x_1}\,\overline{x_2}x_3 + x_2x_2x_3$$

$$R = \overline{x_2}x_1 + x_2\overline{x_3}$$

Obtain the circuit diagram, using a minimum number of NAND gates?