EE 2000 Logic Circuit Design
Semester A 2021A

Tutorial 6

1. There are four judges for a debate of two persons – A and B. Each judge has an ON/OFF button, which is used to record his/her opinion of which one wins his/her vote. The scoreboard shows an ***A*** when the majority vote is in favour of person A and a ***B*** if it is person B. Provision is also made for a ***TIE***.

   (i) Derive the Truth Tables separately for ***A***, ***B***, and ***TIE***.
   (ii) Extract standard SOP and POS for each of the three outputs.
   (iii) Simplify the three logic expressions in SOP form.

2. Construct a 16×1 MUX with two 8×1 and one 2×1 MUXs.

3. Implement the following Boolean function with a 4×1 MUX and external gates. Connect inputs *A* and *B* to the selection lines and inputs C and D to the data input lines of the MUX.

$$F(A,B,C,D) = \Sigma\, m(1,3,4,11,12,13,14,15)$$

4. Construct the PLA diagram with the minimum number of product terms for the following functions.

$$A(x,y,z) = \Sigma\, m(1,2,4,6)$$
$$B(x,y,z) = \Sigma\, m(0,1,6,7)$$
$$C(x,y,z) = \Sigma\, m(2,6)$$
$$D(x,y,z) = \Sigma\, m(1,2,3,5,7)$$