Assignment - 3

1) Implement the following gates using 2:1 multiplexer
     i) NOT
     ii) AND
     iii) OR
     iii) NAND
     iv) NOR
     v) EXOR
     vi) EX-NOR

2) Implement Half Adder & Full Adder using MUX

3) Implement Half subtractor & Full subtractor using MUX

4) Implement the following function with 8:1 MUX
$$F(A, B, C, D) = \pi m (1, 3, 5, 6, 11, 12) + d(7, 9)$$

5) Implement $X = \bar{A}B + ABC + A\bar{C}$ using 4:1 MUX

6) Implement the following function by using 4 to 1 mux and fue other gates as possible

$$f(w_1, w_2, w_3, w_4) = \bar{w}_1 \bar{w}_2 \bar{w}_3 \bar{w}_4 + w_1 w_2 + w_1 w_3 + w_1 w_4 + w_2 w_3 w_4$$

Assume that only uncomplemented inputs w_1, w_2, w_3, w_4 are available

7) Convert the following flip flop
     i) SR to T
     ii) JK to SR
     iii) JK to D
     iv) D to T
     v) T to SR
     vi) T to JK
     vii) T to D

8) Implement 4:16 decoder using 3:8 decoder

9) Implement the following functions using 4:16 decoder

i) $F_1(A,B,C,D) = \Sigma m(1,2,4,7,8,11,12,13)$

ii) $F_2(A,B,C,D) = \Pi M(10,12,13,14)$

iii) $F_3(A,B,C,D) = \Sigma m(1,5,8,10)$

10) Implement the following functions using suitable demux & logic gates.

$Y_1 = f_1(A,B,C) = \Sigma m(0,1,3,5,6)$
$Y_2 = f_2(A,B,C) = \Sigma m(0,1,2,4,6)$
$Y_3 = f_3(A,B,C) = \Sigma m(1,2,3,6)$ Draw logic diagrams

11) Implement the following multiple o/p function using suitable Demux.

$f_1(A,B,C) = \Sigma(0,1,3,7) + d(2,5)$
$f_2(A,B,C) = \Sigma m(1,5,7)$
$f_3(A,B,C) = \Sigma m(0,2,4,6)$

12) Implement 1:16 demux using 1:8 demux