UEC 612 Digital System Design

Tutorial Sheet #3

1. Verify by the truth table method, that $A + \overline{A}.B + A.B = A + B$
2. Prove that, if $A + B = A + C$ and $\overline{A} + B = \overline{A} + C$, then B=C.
3. Given $A.\overline{B} + \overline{A}.B = C$, show that $A.\overline{C} + \overline{A}.C = B$.
4. Simplify the following Boolean functions in SOP & POS using K-map method.
   i. F(A,B,C) = $AB + A\overline{B}C + \overline{A}B\overline{C} + B\overline{C}$
   ii. F(A,B,C,D) = $\sum$ (5,6,9,10,11,13,14,15)
   iii. F(A,B,C,D, E) = $\sum$ (0,1,2,3,4,6, 8,9,10,11)
   iv. F(A,B,C,D, E) = Π (0,1,2,4,5,6,9,11,12,13,14,15)
5. Simplify the following Boolean functions using Q-M method.
   (i) F(A,B,C,D,E,F) = $\sum$m (0,1,2,4,5,7,8,9,10,14,15,17,19,20,28,29,34,36,40,41,42,43)
   (ii) F(A,B,C,D,E,F) = $\sum$m (6,7,8,9) + d(10,11,12,13,14,15)
   (iii) F(A,B,C,D,E,F) = $\sum$m (0,1,2,8,9,15,17,21,24,25,27,31)
   (iv) F(A,B,C,D,E,F) = $\sum$m (0,4,12,16,19,24,27,28,29,31)

6. Simplify the following Boolean functions F along with don't care conditions using K-map method
   (i) Π M(1,4,5,11,12,14) ·d(6,7,15) IN SOP form.
   (ii) Π M(3,6,8,11,13,14) ·d(1,5,7,10) in POS form.