King Fahd University of Petroleum and Minerals
College of Computer Sciences and Engineering
Department of Computer Engineering

COE 202 – Fundamentals of Computer Engineering (T102)

Homework # 03 (*due date & time: Saturday 02/04/2011 during class period*)

***** Show all your work. No credit will be given if work is not shown! *****

Problem # 1 (40 points):
Given $F(A,B,C,D) = \Sigma(1,2,5,9,13)$, and $d(A,B,C,D) = \Sigma(3,7,8,12)$.

i. **(10 points)** Using a K-map, find a simplified SOP expression for *F*.
ii. **(10 points)** Using a K-map, find a simplified POS expression for *F*.
iii. **(10 points)** Using a K-map, find a simplified SOP expression for $\overline{F}$.
iv. **(10 points)** Using a K-map, find a simplified POS expression for $\overline{F}$.

Problem # 2 (40 points):
Write minimized *SOP* **and** *POS* expressions **for both** the *true* and the *complement* form of the following Boolean expressions:

i. **(20 points)** $\bar{X}\bar{Z} + Y\bar{Z} + XYZ$
ii. **(20 points)** $\bar{A}\bar{B}C + B\bar{C}D + \bar{B}C + \bar{A}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + A\bar{B}D$

Problem # 3 (20 points):
For the given truth table and using a K-map:

i. **(10 points)** Find all *prime implicants* and ***essential*** *prime implicants* of *F*.
ii. **(5 points)** Write a minimized SOP expression for the function *F*.
iii. **(5 points)** Write a minimized POS expression for the function *F*.

A	*B*	*C*	*D*	*F*
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0