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

COE 202 – Fundamentals of Computer Engineering (T081)

Homework # 03 (*due date & time: Monday 1/12/2008 during class period*)

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

Problem # 1 (60 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. **(15 points)** Using a K-map, find a simplified SOP expression for *F*.
ii. **(15 points)** Using a K-map, find a simplified POS expression for *F*.
iii. **(15 points)** Using a K-map, find a simplified SOP expression for $\overline{F}$.
iv. **(15 points)** Using a K-map, find a simplified POS expression for $\overline{F}$.

Problem # 2 (20 points):
Simplify each of the following expressions, and implement them with (1) NAND gates, (2) NOR gates. Assume that both true and complement versions of the input variables are available.

i. **(10 points)** $WX' + WXZ + W'Y'Z' + W'XY' + WXZ'$
ii. **(10 points)** $XZ + XYZ' + WX'Y'$

Problem # 3 (20 points):
Convert the AND/OR/NOT logic diagram shown below to (i) a NAND logic diagram, and (ii) a NOR logic diagram.