Worksheet 8
EEL 4705
Emerging Logic Devices – AND/OR Mapping

Group #: _16_   U IDs:

$$F = x_1 + x_2$$

OR-Gate

$$F = x_1 \cdot x_2$$

AND-Gate
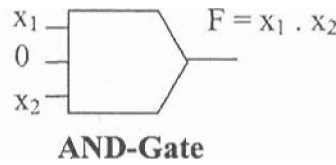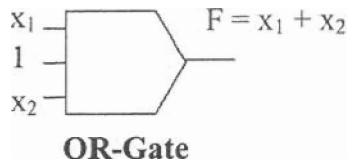
Question: Convert the following Boolean Logic expressions into equivalent Majority Gate Logic by using AND/OR mapping method demonstrated previously making use of the AND and OR forms as indicated above.

Use the method to first perform a direct AND/OR mapping of the expression. Then see if the expression can be further reduced to a simpler logic form and perform an AND OR mapping of the reduced expression.

Example: $n = x_1 . \overline{x_2} + \overline{x_2} . x_3$ *can be further reduced to* $n = (x_1 + x_3) . \overline{x_2}$ *. Similarly, for all the equations below perform the AND/OR mapping for the original expression and the reduced form of the expression.*

(a) $n = (\overline{x_1} + x_2) . (x_1 . x_2)$

$\overline{x_1} . x_1 . x_2 + x_2 . x_1 . x_2$
$0 \quad + \quad x_2 . x_1$

$A \overline{A} = 0$
$A A = A$

$(\overline{x_1} + x_2)(x_1 x_2)$

$x_1 x_2$
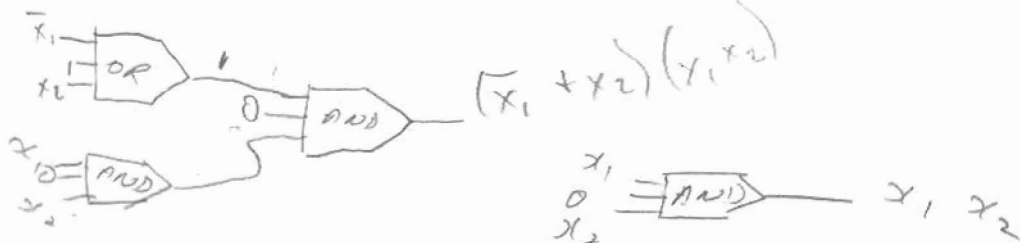
(b) $n = \overline{x_1} . x_3 + x_2 . \overline{x_3}$

$(\overline{x_1} + \overline{x_3}) + (x_2 . \overline{x_3})$

$\overline{x_1} + \overline{x_3} + x_2 . \overline{x_3}$

$\overline{x_1} + \overline{x_3} (1 + x_2)$

$(\overline{x_1} + \overline{x_3}) + (x_2 \overline{x_3})$

$\overline{x_1} + \overline{x_3}$

$\overline{x_1} + \overline{x_3}$