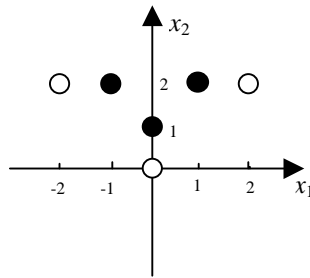


ECE 512 – Winter 1998
Test #1
WSU - ECE
Prof. Mohamad H. Hassoun

I. Consider the Boolean function $y(\mathbf{x}) = \bar{x}_1\bar{x}_2\bar{x}_3 + x_1x_2 + x_2x_3$.

- a. Draw the K-Map for $y(\mathbf{x})$.
- b. Identify the threshold patterns in the K-Map of part *a* and use them to construct a Threshold-OR net realization of y . Do not specify any weight/threshold values.

II. Consider the following two-class patterns:



- a. Give the equation, by inspection, of a proper quadratic separating surface for the above problem.
- b. Determine the weights and threshold for a QTG that realizes the separating surface you have generated in part *a*.

III. Let $g(x) = \frac{1}{2} + x^2$ and $y(x) = a + bx$. Find the parameters a and b that minimize the objective function: $\int_0^2 [g(x) - y(x)]^2 dx$.

IV. Show that: $\sum_{i=0}^n \binom{n}{i} = 2^n$