**CIS 3362 Test #1: Classical Cryptographic Schemes**

**Date: 9/17/2012**

**Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1) (12 pts) Encrypt “FOOTBALL” using the affine cipher with the following encryption function: f(x) = (7x + 14) mod 26.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2) (10 pts) The set of letters S consists of 1 A, 3 Bs, 5 Cs, 7 Ds, and 9 Es. What is the index of coincidence of the set S?

3) (15 pts) Consider an affine cipher for a language with 48 letters. If an encryption function for this alphabet is g(x) = (17x + 20) mod 48, what is the corresponding decryption function?

4) (7 pts) How long would a message have to be in number of letters before it was guaranteed that the Enigma would encrypt two letters in that message with the exact same substitution?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) (12 pts) What is the corresponding decryption key for the encryption key $\left(\begin{matrix}5&8\\7&5\end{matrix}\right)$ for the Hill cipher with an alphabet of size 26?

6) (12 pts) Encrypt the phrase, “FOXJUMPSOVERLAZYDOG” using the Vigenere Cipher with the key “SOCCER”.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) (12 pts) Decrypt the following phrase that was encrypted with the Playfair cipher with the key, “PEZDISPENSER”: “CPAVBVVZBQFDARWZ”

8) (15 pts) Decrypt the following message:

“OSBETHNYTSEHAYTSMVNCOAPRTWSADEENHIDIEEEIMX”

The message was encrypted using transposition with the keyword, “KERMIT”.

9) (5 pts) Name one type of food sold at the restaurant chain, “Noodles and Company.”

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Scratch Page – Please clearly mark any work on this page you would like graded.**