

CIS 3362 Test #1: Classical Cryptographic Schemes

Date: 9/23/2016

Name : _____

1) (10 pts) The cipher text "PAPCIJGXCXV" was encrypted using the shift cipher with an encryption key of 15. What is the corresponding plaintext?

2) (10 pts) The set of letters S consists of 5 As, 10 Bs, 15 Cs, 10 Ds, and 10 Es. The set of letters T consists of 15 As, 25 Bs, 30 Cs, 15 Ds and 15 Es. What is the mutual index of coincidence between sets S and T? **Leave your answer as a fraction in lowest terms.**

3) (20 pts) Consider an affine cipher for a language with 61 letters. If an encryption function for this alphabet is $g(x) = (36x + 29) \bmod 61$, what is the corresponding decryption function? (Your function must be of the form $g^{-1}(x) = (ax + b) \bmod 61$, where a and b are in between 0 and 60, inclusive.)

4) (15 pts) Consider a Hill cipher for an **alphabet of size 45**. What is the corresponding decryption key for the encryption key $\begin{pmatrix} 2 & 17 \\ 3 & 11 \end{pmatrix}$?

5) (12 pts) Encrypt the plaintext "WEAREWORKING" using the Vigenere cipher and the keyword "HOUSE".

6) (14 pts) Decrypt the message, "ABEPCLCFWNAMNX", which was enciphered using the Playfair cipher with the key "TURTLES". Note: The padding character used was "Q".

7) (15 pts) Determine $59^{-1} \pmod{107}$

8) (4 pts) In which Swiss town is Gruyere cheese made? _____

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