

Fall 2017 CIS 3362 Exam #1: Classical Cryptographic Schemes

Date: 9/27/2017

Name : _____

1) (10 pts) Encrypt the plaintext "QUICKFOXES" using the shift cipher with an encryption key of 7.

2) (10 pts) The set of letters S consists of 15 As, 40 Bs, 20 Cs, 15 Ds, and 10 Es. What is the index of coincidence of the set S? **Leave your answer as a fraction in lowest terms.**

3) (15 pts) You are attempting to decrypt a message that was encrypted with the affine cipher. You believe that the ciphertext letter 'K' maps to the plaintext letter 'J' and that the ciphertext letter 'H' maps to the plaintext letter 'S'. Using this information, set up a system of equations to solve for the decryption keys a and b , where the function to decrypt the cipher text is $f(x) = ax + b \pmod{26}$, and solve the system to determine the values of a and b .

4) (15 pts) Decrypt the ciphertext "HFZBUIFEWYBXMTE" that was encrypted with the Vigenere cipher with the keyword SOLVEIT.

5) (8 pts) Encrypt the plaintext "GLAD" with the Hill Cipher using the encryption key $\begin{pmatrix} 4 & 3 \\ 9 & 11 \end{pmatrix}$.

6) (7 pts) Decrypt the message, "MLBATSSZVKELKR", which was enciphered using the Playfair cipher with the key "TELEVISION". Note: The padding character used was "Q".

7) (15 pts) Determine $108^{-1} \pmod{131}$. Please express your answer as an integer in between 0 and 130, inclusive.

8) (15 pts) The ciphertext "DAHTRTMHLMNAAEESIREWEXOYWIOOHSOT" was encrypted with the double column transposition cipher with the first keyword was "DRINK" and the second keyword was "SKIP". Determine the corresponding plaintext.

9) (5 pt) By what acronym is the National Football League known? _____

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