1. (Vigenere Cipher) In Vigenere Cipher, what is the encrypted ciphertext of plaintext *husky* using the key \( K = [19, 6, 8, 16, 2] \)?

(a) Cipher = [A A A A A]  
(b) Cipher = [C A N E Q]  
(c) Cipher = [B Q Z A B]

2. (Hill Cipher) Define a 2 \( \times \) 2 matrix \( K \)  by

\[
\begin{pmatrix}
0 & 1 \\
1 & 0 \\
\end{pmatrix}
\]

What is \( K^{-1} \) mod 26?

(a) \( K^{-1} = \begin{pmatrix} 1 & 25 \\ 25 & 1 \end{pmatrix} \).

(b) \( K^{-1} = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \).

(c) \( K^{-1} = \begin{pmatrix} 1 & 2 \\ 0 & 4 \end{pmatrix} \).

3. (Permutation Cipher) Consider a permutation cipher with \( m = 5 \) and a key \( \pi \) defined as follows:

\[
\begin{array}{c|c|c|c|c|c}
\hat{j} & 1 & 2 & 3 & 4 & 5 \\
\hline
\pi(j) & 4 & 1 & 5 & 2 & 3 \\
\end{array}
\]

Please encrypt the following plaintext: *huskygreat*.

(a) Cipher = [K H Y U S A G T R E]  
(b) Cipher = [U K Y H S R A T G E]  
(c) Cipher = [U H Y S K R T E G A]

Answers: ABA