Cryptography Quiz 7

1. (4 points) Let S_1 and S_2 be the standard Vigenére and Permutation ciphers, respectively, with $\mathcal{P} = (\mathbb{Z}_{26})^5$ (so the block length of each is $m = 5$). Consider the product cipher $S_1 \times S_2$. Consider the keycode $k_1 =$ `latex` in Vigenére Cipher, and the key k_2 in Permutation Cipher given by

1	2	3	4	5
4	5	2	1	3

   Find the decryption $d_{(k_1,k_2)}$(`IEAEDURMZXALZTM`) in $S_1 \times S_2$. Write your plaintext with spaces.

2. (3 points) Find a Vigenére keycode k_1' such that $d_{(k_2,k_1')}$(`IEAEDURMZXALZTM`) in $S_2 \times S_1$ is the same plaintext you obtained in previous problem.

3. (4 points) Let M be the Multiplicative Cipher and S be the Shift Cipher. For the encryption rule $e_{(9,15)}(x)$ in $M \times S$, find the corresponding encryption rule $e_{(c,d)}(x)$ in $S \times M$. In other words, find the value of c and d such that $e_{(c,d)}(x)$ in $S \times M$ is equal to $e_{(9,15)}(x)$ in $M \times S$

4. (9 points) Find the solution for problem 4 of the problem set 5. You should also write the intermediate results (i.e., the rows A, B, D, E, F, G, H, and J from Figure 1).