## Quiz1

Department: Student ID: Name:

- 1. Please write a program to find out the frequencies of letters in the ciphertext down below.
- 2. Use these plaintext frequency count information as a reference to break this encrypted messages.
- 3. Assume C is Ciphertext, P is Plaintext. Can you find out a particular relationship in between C and P?
- 4. Suppose  $f(x) = ax + b \pmod{26}$  where x is plaintext, please solve the value of a and b.
- 5. What is the size of key space in the 26 letter cipher? Remember, in this quiz, the key of this substitution cipher is defined as a unique replacement of each letter with another one. e.g., A->D, B->M

## Ciphertext:

K YZWLNKXKJWGN QUGN ETNMX
MPLMZOMXYM K TMMJOXA XEN
TKZ ZMQEBMF TZEQ KJKZQ EX
KXKJWDOXA KXF MPLJEZM
NHM TJEEF ET XMI CXEIJMFAM IHOYH
MKYH WMKZ RZOXAG IONH ON

Appearance Frequency:

Α	В	С	D	E	F	G	Н	1	J	K	L	M	N	0	Р	Q	R	S	Т	U	٧	W	X	Υ	Z
4	1	1	1	10	4	3	5	4	7	12	3	17	8	7	2	4	1	0	6	1	0	4	12	4	9

Common frequency of letters appearance: (%)

E	Α	R	1	0	T	N	S	L	С	U	D	Р
11.16	8.5	7.58	7.54	7.16	6.95	6.65	5.74	5.49	4.54	3.63	3.38	3.17
M	Н	G	В	F	Υ	W	K	V	X	Z	J	Q
3.01	3.0	2.47	2.07	1.81	1.78	1.29	1.10	1.01	0.29	0.27	0.20	0.20

Cipher	Α	В	С	D	E	F	G	Н	1	J	К	L	M
	1	2	3	4	5	6	7	8	9	10	11	12	13
Plaintext													

N	0	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26