Homework 1 Cryptography

1 a)

Letter in Ciphertext	Number of Times in Ciphertext	Frequency
C	150×	13.93%
B	100×	9.29%
D	86×	7.99%
G	83×	7.71%
F	76×	7.06%
A	75×	6.96%
I	70×	6.5%
E	58×	5.39%
L	50×	4.64%
K	47×	4.36%
H	45×	4.18%
J	40×	3.71%
M	37×	3.44%
S	24×	2.23%
N	24×	2.23%
Q	23×	2.14%
O	19×	1.76%
P	19×	1.76%
U	15×	1.39%
R	15×	1.39%
V	9×	0.84%
T	9×	0.84%
Y	3×	0.28%

1 b) electrical and computer engineers develop and create products that change the world and make our lives easier the cell phones we depend on the computers used in national security and the electrical systems that make our cars operate were all created by electrical and computer engineers at wpi we keep that progress moving forward with our innovative research and out-of-the box approaches the department of electrical and computer engineering at wpi

challenges students to push themselves to understand societys and technologys complex issues in a broader context than whats in front of them we want our students whether they are earning an undergraduate minor or a doctorate to tackle societys most pressing problems and uncover new ways of solving them whether its developing systems that can locate firefighters in the middle of a burning building or creating neuroprosthetics that look and function like natural limbs our faculty and students are at the front edge of remarkable innovation while advancing technologies is at our core we also take human connections very seriously in ece we pride ourselves on the family-like atmosphere we cultivate; faculty students and staff encourage each others every success and are there for the challenges both in the classroom and in life

To decrypt the message above, I pasted the ciphertext on a word document and used the English language common letter frequencies to replace the first two most frequent letters in the ciphertext, which were C and B, with E and T respectively. Then I went through the rest of the ciphertext to find common English words such as “the” or “that” to find the rest of the letters and used the “find and replace” feature to replace all the ciphertext letters to the actual English letters

1 c)

Letter in Ciphertext	Letter in Plaintext	Number of Times in Ciphertext	Frequency
C	e	150×	13.93%
B	t	100×	9.29%
D	a	86×	7.99%
G	n	83×	7.71%
F	o	76×	7.06%
A	r	75×	6.96%
I	s	70×	6.5%
E	i	58×	5.39%
L	c	50×	4.64%
K	l	47×	4.36%
H	h	45×	4.18%
J	d	40×	3.71%
M	u	37×	3.44%
S	p	24×	2.23%
N	m	24×	2.23%
Q	g	23×	2.14%

O	w	19×	1.76%
P	f	19×	1.76%
U	v	15×	1.39%
R	y	15×	1.39%
V	k	9×	0.84%
T	b	9×	0.84%
Y	x	3×	0.28%

Rearrange the plaintext letters into the alphabet to find the key:

Plaintext Alphabet	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
Ciphertext Alphabet	D	T	L	J	C	P	Q	H	E	-	V	K	N	G	F	S	-	A	I	B	M	U	O	Y	R	-