



SCIENCE OLYMPIAD
— AT THE —
UNIVERSITY OF FLORIDA

Northern Regional: January 19th, 2019

Code Busters C Answer Key

Name(s): _____

Team Name: _____

School Name: _____

Team Number: _____

Rank: _____

Score: _____

Time (official use only):

Timed Question[100 Points]: Solve the following Aristocrat. Once solved, raise your hand so that your proctor may check your answer and record your time.

**GKFI OWMAI KI IAU LKC W IAWON IAKI W AKT
LAST NIGHT AT THE BAR I THINK THAT I HAD
IHH JVRA IH TCWON.
TOO MUCH TO DRINK.**

Ciphertext Frequency Table

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
6		2			1	1	3	9	1	5	1	1	2	3			1		2	1	1	5			

1) Decrypt the following Atbash Cipher[100 Points].

ZUGVI Z OLMT WZB LU DLIP, SV WVXRWW GSZG
AFTER A LONG DAY OF WORK, HE DECIDED THAT
SV MVVWW GL GZPV Z YIVZP.
HE NEEDED TO TAKE A BREAK.

2) Decrypt the following Aristocrat [200 points].

QD QFFSY Q RQZ AYYFK MPY RGWMGL QNQZ.
AN APPLE A DAY KEEPS THE DOCTOR AWAY.

3) Encrypt the Affine Cipher with the key $a=7$ and $b=14$ [250 Points].

Once upon a time, a man named John crossed the street
Ibcq ypib o rsuq, o uob bouqj Zilb cdikkqj rlq krdqqr
to go get some water from the well. As he crossed the
ri ei eqr kiuq morqd xdiu rlq mqnn. Ok lq cdikkqj rlq
street on the way back, he spilled the water and had to
krdqqr ib rlq moa vocg, lq kpsnnqj rlq morqd obj loj ri
return for more.
dqrydb xid uidq.

4) Decrypt the following Vigenere Cipher using the key "SWEET" [300 Points].

Tevhl sni oggsr xh eekvtla jvhe lpevw ps tesyi xh
Birds are known to migrate from place to place to
 hkwmmakr xawiwenaw mg s hsgtlesr papl e lmexeuda
position themselves in a location with a suitable
 xifhavemmni jhj plif lk xlkari.
temperature for them to thrive.

5) Compute the decryption matrix of the following encryption matrix of a 2x2 Hill Cipher [500 Points]:

$$\begin{bmatrix} 5 & 7 \\ 5 & 12 \end{bmatrix}$$

$$\begin{bmatrix} 14 & 7 \\ 5 & 21 \end{bmatrix}$$

6) The following symbols encode a phrase using the Baconian alphabet. What does it say? [300 points]

----- + + + + _ + ----- + ----- + _ + _ + + + + _ + _ + -----
 + _ + _ + _ + _

A piece of cake

7) Decrypt the following Spanish Xenocrypt [500 Points].

AY LAYZW AD JYGD EFD CLGDQ VL SLQDL SD LMFJL DO VL
mi amigo me dice que hacer la tarea te ayuda en la
 DRGFDVL.
escuela.

8) Decrypt the following Patristocrat where the ciphertext letters “QPP” decrypt to “TOO” [450 Points].

**TUYXUQPPWPAWUXAUSYHPVQLPTOVWLOPAUCTULYEUYAS
WEARETOOCONCERNEDABOUTHOWMUCHMONEYWEHAVEAND
APQYHPVQLPTLYJJCTUYXU
NOTABOUTHOWHAPPYWEARE**

9) Decrypt the following Cipher [250 Points].

esp mpde hlj ez xlitxtpk azhpc qzc esp pyetcp ntej hzfwo mp
the best way to maximize power for the entire city would be
ez mzes xtyttxkp pypcrj nzydfxaetzy ld hpww ld tyncpldp pypcrj
to both minimize energy consumption as well as increase energy
rpypcletzy.
generation.

10) Encrypt the following Vigenere cipher with the key “WACKO” [250 Points].

Failure is the fog through which we glimpse triumph. A world
Bakvine kc hde hyu phtyich yrwyh yo uhiozga ttsiipj. K kkrnn
without failure is a world without success.
ketjyip fcszqrg sg w wqbzz wkdvkuv ciycgcg.

11) Encrypt the following affine cipher using the key: $a=9$ and $b=18$ [250 Points].

My father once told me that robots were going to take over the world. I did not believe him at first, but now I am starting to rethink it.

Wa lshdep ofkc hont wc hdsh pobohy icpc uomfu ho hsec ozcp hdc iopnt. M tmt foh benmczc dmw sh lmpyh, bqh foi M sw yhsphmfu ho pchdmfe mh.

12) Decrypt the following Aristocrat [350 Points].

RV QDTSKURODT RGS UBONS VI HDIHDHRL, LVQ YQUR
To understand the scale of infinity, you must
EHBRQKS OD SDTNSUU OKKOL VI VWCSBRU VK
picture an endless array of objects or
DQYWSKU. SZSD AGHNS TVHDP UV, HR YOL WS
numbers. Even while doing so, it may be
THIIHBQNR RV PKOUE.
difficult to grasp.

13) Decrypt the following Patristocrat where the ciphertext letters “RHH” decrypt to “ALL” [600 Points].

RTEXGRHHQTECXCRGSFQGOECREUJPEUBUEXBSXSPJJ
AFTERALLOFTHEHARDWORKTHATIPUTINITENDEDPAYINGOFF
RVUBLQTTTRZFXFQBECXBREUQBRHMCRIJUQBZCUJ.
ASWEWONTHENATIONALCHAMPIONSHIP.

14) Decrypt the following atbash cipher [200 Points].

GSV NZM RM GSV SZG DZOPVW ZXILHH GSV HGIVVG
The man in the hat walked across the street
LMOB GL URMW ZM VNKGB DZIVSLFHV.
only to find an empty warehouse.

15) Decrypt the following Caesar Cipher [250 Points].

XOD SYXSM OAEKDSYXC KBO LKVXMON OAEKDSYXC
Net ionic equations are balanced equations
GRSMR NY XYD SXMVENO DRO KAEOYEC SYXC ZBOCOXD
which do not include the aqueous ions present
SX SYXSM OAEKDSYXC YX LYDR CSNOC.
in ionic equations on both sides.

16) Decrypt the following Aristocrat [400 Points].

HRC WLVG CJAC VA QWPP NQ FEAHCJVCA. MC RYGC
FNJC
The universe is full of mysteries. We have more
SWCAHV NLA YXNWH VH HRYL MC IN YLAMCJA.
questions about it than we do answers.

17) Decrypt the following Vigenere Cipher using the key “PET” [300 Points].

ljm kbcp gh ipy visoa eg esermxvvmgp bsqcc kjwyyf fw vw krv
the goal of all teams at competition today should be to get
jatax cneug. ipgjsmip mg ymdn ji qkjxkkyyv, efablvpk au
first place. although it will be difficult, anything is
Xsfumtnm.
possible.

18) Decrypt the following Aristocrat [350 Points].

DS DJ RXLY SK TKWILURUGY RKV CXLOU SRU BGDPUJLJ DJ, AUS
It is hard to comprehend how large the universe is, yet
VU RXPU GKS EKBGY XGA CDEU FBS VRXS DJ RULU KG UXLSR.
we have not found any life but what is here on Earth.

19) Compute the decryption matrix of the following encryption matrix of a 2x2 Hill Cipher [400 Points].

$$\begin{bmatrix} 8 & 9 \\ 7 & 4 \end{bmatrix}$$

$$\begin{bmatrix} 20 & 7 \\ 17 & 14 \end{bmatrix}$$

20) Decrypt the following Aristocrat [350 Points].

EUXYBUVH WK KUXYLEWDZ LEGL XGDM KLRIYDLK IU
Homework is something that many students do
DUL CWHY, ARL WL WK KUXYLEWDZ LEGL BY GCC
not like, but it is something that we all
EGSY LU IU.
have to do.