

Cryptology Practice Test #1

Classic Cryptology

Part I: Non-computer

1. State 3 of the 6, “general principles of cryptology.”

2. Perform a shift key of 4 to decrypt, “mlsticsyhighvctxxlmwtvstivpc.”

3. What is the difference between a code and a cipher?

4. What is Steganography?

5. What is frequency analysis?

6. Using the keyword, “conference” and the Vigenere cipher, encrypt the word, “hippo.”

7. Give a short description of how the Enigma machine works.

8. Encrypt, “This is a test” using Playfair and the keyword, “polygraphic.”

9. What is a centiban score and which cipher did we use it for?

10. Encrypt, “This is a test and I am going to get an A on it” using a column cipher and the keyword, “transposition.”

For questions 11 – 14, use the VBA code below.

```

Sub ShiftCipher()
    'Make sure plaintext is in cell B1
    'Make sure the shift amount is in
    cell B3
    'Press the button on the sheet to
    encrypt

    Dim Alphabet As Variant
    Dim Loop1 As Integer
    Dim Loop2 As Integer
    Dim Length As Integer
    Dim Plain_temp As String
    Dim Cipher_temp As String
    Dim Shift As Integer

    'Initializes the alphabet as array
    Plain
    Alphabet = Array("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")

    'Find the length of the plaintext
    Length = Len(Range("B1").Value)

    'Stores the plaintext to a
    temporary variable plain_temp

    Plain_temp = Range("B1").Value

    'Stores the shift amount to a
    temporary variable
    Shift = Range("B3").Value

    'Encrypts
    'Loop1 loops through the plaintext
    'Loop2 determines the number of the
    alphabet a single plaintext
    character is.
    For Loop1 = 1 To Length
        For Loop2 = 0 To 25
            If Mid(Plain_temp, Loop1,
            1) = Alphabet(Loop2) Then
                Cipher_temp =
                Cipher_temp & Alphabet((Shift +
                Loop2) Mod 26)
            Exit For
            End If
        Next Loop2
    Next Loop1

    'Outputs the ciphertext to the
    screen
    Range("B2").Value = Cipher_temp
End Sub

```

	A	B	C
1	Plaintext		<i>Input plaintext in B2</i>
2	Ciphertext		<i>Ciphertext will appear in B1</i>
3	Shift Amount		<i>Input shift amount</i>
4			
5	Encrypt (Shift Cipher)		
6			

11. What is the purpose of a “Exit For” statement?

12. In the code above what is alphabet(10)?

13. What is does the LEN function do?

14. What does, “Mid(Plain_temp, Loop1, 1)” represent?

Part II: Computer allowed (Internet not allowed.)

15. Use the Hill cipher and the key $\begin{pmatrix} 3 & 7 \\ 4 & 11 \end{pmatrix}$ to encrypt the word, "Playfair."

16. Encrypt, "This is a test" using an Affine cipher with a key of $a = 3$ and $b = 7$.

17. The following text was encrypted using a keyword cipher. What does "t", "h", and "e" replaced with?

SNRE BHGW RGSB GPRI NUGS BGAI EHGA WBSN SNRT HXSN RCIP DIEI
GOSN RWHE TSNR YNUG SROI GOSN RYNU GSRO SBEE ISEI QSSN RYQU
LJLB QROI QSIA IGOQ HHGS HHDB SQEB TRSN RGPI FRSN RKUR QSBH
GNHW SNRQ JHBE QNHU EOMR OBVB OROK UILS RLFH SNBQ QSIA LHIL
ROSN REBH GQHS NRHS NRLI GBFI EQQD BGGR OBSI GOPU SBSB GSHT
HULJ ILSQ SNRG SNRE BHGS HHDN BQQS IGOB GTLH GSHT SNRP ILPI
QQIG OJLH GHUG PROC UOAF RGSS NRTB LQSK UILS RLBQ THLF RBGF
YPIJ IPBS YIQD BGAH TMRI QSQS NRQR PHGO BQFB GRIQ ILMB SRLI
GHSN RLQN ILRP HFRQ SHFR THLF YJIL SBGS NRPN IQRI GOIQ THLS
NRTH ULSN KU