Sample Quiz Questions
Cipher & Code System

Vocabulary/Procedural

For the following questions, you must show evidence of the steps you followed to arrive at your final answer.

1. Demonstrate how an additive cipher system works by showing the process for enciphering the word 'COW' using an additive key of 17

2. Demonstrate how a multiplicative cipher system works by showing the process for enciphering the word 'COW' using a multiplicative key of 11

3. Demonstrate how an affine cipher system works by showing the process for enciphering the word 'COW' using an additive key of 8 and multiplicative key of 5

4. Decipher the message 'CFMUWS' which was enciphered using an affine cipher system using an additive key of 4 and multiplicative key of 9 in mod 26

5. Demonstrate how a mono-alphabetic, keyword-based substitution system works by showing/detailing the process for enciphering the word 'STATE' using the keyword 'CAT'

6. Encipher the phrase 'All dogs will go to heaven' using a rectangular transposition system with 7 rows and 3 columns.

Select the most correct answer.

7. A letter frequency analysis provides useful information for trying to break a transposition enciphering system.

   (A) True   (B) False

8. Which of the following values are valid keys for a multiplicative cipher in mod 30

   (A) 5   (B) 8   (C) 13   (D) 14   (E) 21

9. In a ___ substitution cipher system, the plaintext letter 'G' will always be replaced with the same ciphertext letter.

   (A) mono-alphabetic   (B) poly-alphabetic   (C) poly-graphic   (D) both choices (B) and (C)

10. In an additive cipher system, the greatest common factor of the additive key and mod number must be 1

    (A) True   (B) False

11. What value for n makes the following true: $3^n \equiv 1 \pmod{22}$

    (A) 10   (B) 9   (C) 22   (D) 21   (E) none of these

Conceptual/Reasoning

Answer the following using complete, well-formed, grammatically correct sentences.

12. Explain the difference between a code system and a cipher system by comparing/contrasting their respective advantages/disadvantages.

13. Explain the difference between poly-alphabetic substitution and poly-graphic substitution.

14. Explain how/why using a mod that is a prime number is easier than using a mod that is a composite number.