# Sample Paper

## Question 1: Explain the categories of passive and active security attacks. Provide examples for each.

Answer:  
Explain the categories of passive and active security attacks. Provide examples for each. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 2: Encrypt the plaintext 'hello world' using the Vigenère Cipher with the key 'SECURITY'. Provide a step-by-step explanation of the process.

Answer:  
Encrypt the plaintext 'hello world' using the Vigenère Cipher with the key 'SECURITY'. Provide a step-by-step explanation of the process. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 3: Explain the encryption and decryption process of the Feistel Cipher. Include a diagram to support your explanation.

Answer:  
Explain the encryption and decryption process of the Feistel Cipher. Include a diagram to support your explanation. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 4: Compare and contrast the True Random Number Generator (TRNG) and Pseudorandom Number Generator (PRNG). Include examples of their applications.

Answer:  
Compare and contrast the True Random Number Generator (TRNG) and Pseudorandom Number Generator (PRNG). Include examples of their applications. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 5: Discuss the security requirements for a public-key cryptosystem. Why is RSA considered a secure algorithm, and what potential attacks could compromise it?

Answer:  
Discuss the security requirements for a public-key cryptosystem. Why is RSA considered a secure algorithm, and what potential attacks could compromise it? An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 6: Explain the differences between block ciphers and stream ciphers. Provide examples of each and discuss their appropriate use cases.

Answer:  
Explain the differences between block ciphers and stream ciphers. Provide examples of each and discuss their appropriate use cases. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 7: Describe the purpose and process of the AES SubBytes transformation. Perform the SubBytes transformation on the matrix using the AES S-box.

Answer:  
Describe the purpose and process of the AES SubBytes transformation. Perform the SubBytes transformation on the matrix using the AES S-box. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 8: Explain the Hill Cipher encryption technique. Encrypt the plaintext 'ACT' using the given key matrix and show all steps in your calculation.

Answer:  
Explain the Hill Cipher encryption technique. Encrypt the plaintext 'ACT' using the given key matrix and show all steps in your calculation. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 9: In the context of public-key cryptography, describe the requirements of a secure algorithm. Explain why modular arithmetic is critical to RSA and provide an example calculation.

Answer:  
In the context of public-key cryptography, describe the requirements of a secure algorithm. Explain why modular arithmetic is critical to RSA and provide an example calculation. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 10: Discuss the differences between the One-Time Pad and other classical encryption techniques like Caesar Cipher or Vigenère Cipher. Why is the One-Time Pad considered unbreakable under certain conditions?

Answer:  
Discuss the differences between the One-Time Pad and other classical encryption techniques like Caesar Cipher or Vigenère Cipher. Why is the One-Time Pad considered unbreakable under certain conditions? An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 11: Explain the categories of security services. How do they contribute to maintaining a secure system?

Answer:  
Explain the categories of security services. How do they contribute to maintaining a secure system? An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 12: What is the difference between symmetric and asymmetric encryption? Provide examples and explain when each is used.

Answer:  
What is the difference between symmetric and asymmetric encryption? Provide examples and explain when each is used. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 13: Perform encryption and decryption using the Rail Fence Cipher with a depth of 3 on the plaintext: 'HELLOCRYPTO'. Show all steps.

Answer:  
Perform encryption and decryption using the Rail Fence Cipher with a depth of 3 on the plaintext: 'HELLOCRYPTO'. Show all steps. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 14: Discuss the significance of Fermat’s Little Theorem in cryptography. Provide an example calculation to illustrate its application.

Answer:  
Discuss the significance of Fermat’s Little Theorem in cryptography. Provide an example calculation to illustrate its application. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 15: What are the advantages and challenges of the Double DES encryption method? Explain the 'meet-in-the-middle' attack and its impact on Double DES.

Answer:  
What are the advantages and challenges of the Double DES encryption method? Explain the 'meet-in-the-middle' attack and its impact on Double DES. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 16: Explain the difference between the output feedback (OFB) mode and cipher block chaining (CBC) mode in block ciphers. Include diagrams for both.

Answer:  
Explain the difference between the output feedback (OFB) mode and cipher block chaining (CBC) mode in block ciphers. Include diagrams for both. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 17: Describe the concept of modular arithmetic and explain its importance in cryptography. Provide an example demonstrating modular exponentiation.

Answer:  
Describe the concept of modular arithmetic and explain its importance in cryptography. Provide an example demonstrating modular exponentiation. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 18: What is the Euclidean algorithm, and how is it used to find the greatest common divisor (GCD)? Use an example to demonstrate the process.

Answer:  
What is the Euclidean algorithm, and how is it used to find the greatest common divisor (GCD)? Use an example to demonstrate the process. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 19: Explain the purpose and process of the AES ShiftRows transformation. Provide an example to illustrate how it works.

Answer:  
Explain the purpose and process of the AES ShiftRows transformation. Provide an example to illustrate how it works. An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4

## Question 20: Discuss the requirements for a secure public-key cryptosystem. How do these requirements ensure system security?

Answer:  
Discuss the requirements for a secure public-key cryptosystem. How do these requirements ensure system security? An answer that partially addresses the question but omits examples or full clarity as required by the rubric.

Score: 1, 2, 3, 4