

Cosmic Cryptography and Communication

Codes And Ciphers In Astronomy · Answer Key · 12 Questions

1. What was the primary method used by the Voyager 1 and 2 probes to encode and transmit scientific data back to Earth?

- A) Morse Code
- B) Binary Code**
- C) ASCII text
- D) Hexadecimal shorthand

2. The Arecibo message, sent in 1974, used a binary signal designed to be decoded as what?

- A) A mathematical proof
- B) A 23x73 pixel image**
- C) A list of prime numbers
- D) A musical composition

3. Which encryption or encoding standard was standard for the Apollo Guidance Computer to process navigation data?

- A) Base-10 decimal
- B) Asynchronous binary
- C) Reed-Muller error-correcting code**
- D) Substitution cipher

4. In the 1960s, what technique was used to decipher the irregular, repeating radio pulses emitted by Pulsar PSR B1919+21?

- A) Fourier analysis**
- B) Caesar shift
- C) Vigenere cipher
- D) One-time pad

5. The Golden Record carried by the Voyager spacecraft uses a cover plate etched with symbols that act as a:

- A) Vigenere key
- B) Pictographic instructional code**
- C) Book cipher
- D) Transposition matrix

6. What is the purpose of the error-correction coding embedded in the telemetry signals received from the Mars Perseverance rover?

- A) To translate alien languages
- B) To protect data from cosmic radiation corruption**
- C) To hide flight paths from public view
- D) To encrypt the rover's location

7. To communicate over vast interplanetary distances, the Deep Space Network uses what to prevent signal loss during data decoding?

- A) Turbo codes**
- B) Polyalphabetic ciphers
- C) Rail fence ciphers
- D) Atbash ciphers

8. What mathematical concept was used by SETI researchers to identify potentially artificial signals among cosmic noise?

- A) Prime number sequences**
- B) Pigpen cipher
- C) Enigma machine settings
- D) Playfair square

9. The term 'telemetry' in spacecraft communication refers to the process of:

- A) Encoding flight path secrets
- B) Automatically recording and transmitting measurements**
- C) Encrypting the pilot's voice
- D) Translating radio waves to text

10. Before modern digital encryption, what simple method did early astronomers use to hide the identity of their discovery of a new planet?

- A) Anagrams**
- B) Book ciphers
- C) Null ciphers
- D) Steganography

11. In the context of the SETI institute, what is 'The Great Silence' often mathematically represented as?

- A) The Fermi Paradox**
- B) The Vigenere Table
- C) The Shannon Entropy limit
- D) A null ciphertext

12. What type of signal format did the Pioneer 10 plaque use to provide a universal reference for Earth's location?

A) Binary-to-decimal notation

B) Atomic transition frequency of hydrogen

C) Morse code pulses

D) Optical substitution cipher