[Multiplicative Cipher]

key Selection :-

We should select only coprime number of 26
which should not divisible by [2 or 13].

Message ⟶ HELLO

Encryption :-

$$C = (P * k) \bmod 26.$$

P ⟶ Numeric value of plain text
k ⟶ key.

H ⟶ (7 × 3) mod 26 ⟶ 21 mod 26 ⟶ 21 ⟶ V
E ⟶ (4 × 3) mod 26 ⟶ 12 mod 26 ⟶ 12 ⟶ M
L ⟶ (11 × 3) mod 26 ⟶ 33 mod 26 ⟶ 7 ⟶ H
L ⟶ (11 × 3) mod 26 ⟶ 33 mod 26 ⟶ 7 ⟶ H
O ⟶ (14 × 3) mod 26 ⟶ 42 mod 26 ⟶ 16 ⟶ Q

VMHHQ ⟶ Encrypted Message

Decryption:-

$$P = (c * k^{-1}) \% 26$$

$c \to$ Mnemonic Value

$k^{-1} \to$ Multiplicative inverse of the key

VMHHQ

$V \to 20 \to (20 * \frac{1}{3}) \bmod 26 \to (21 \times 9) \% 26 \to 7 \to H$

$M \to 12 \to (12 * \frac{1}{3}) \bmod 26 \to (12 \times 9) \% 26 \to 4 \to E$

$H \to 7 \to (7 * \frac{1}{3}) \bmod 26 \to (7 \times 9) \% 26 \to 11 \to L$

$H \to 7 \to (7 * \frac{1}{3}) \bmod 26 \to (7 \times 9) \% 26 \to 11 \to L$

$Q \to 16 \to (16 * \frac{1}{3}) \bmod 26 \to (16 \times 9) \% 26 \to 14 \to 0$

HELLO $\to$ Decrypted message.