

Assignment 201

P.T. = GOOD MORNING.

Key = (7, 9) → additive (K₂)
multiplicative (K₁)

G O O D M O R N I N G
6 14 14 3 12 14 17 13 8 13 6

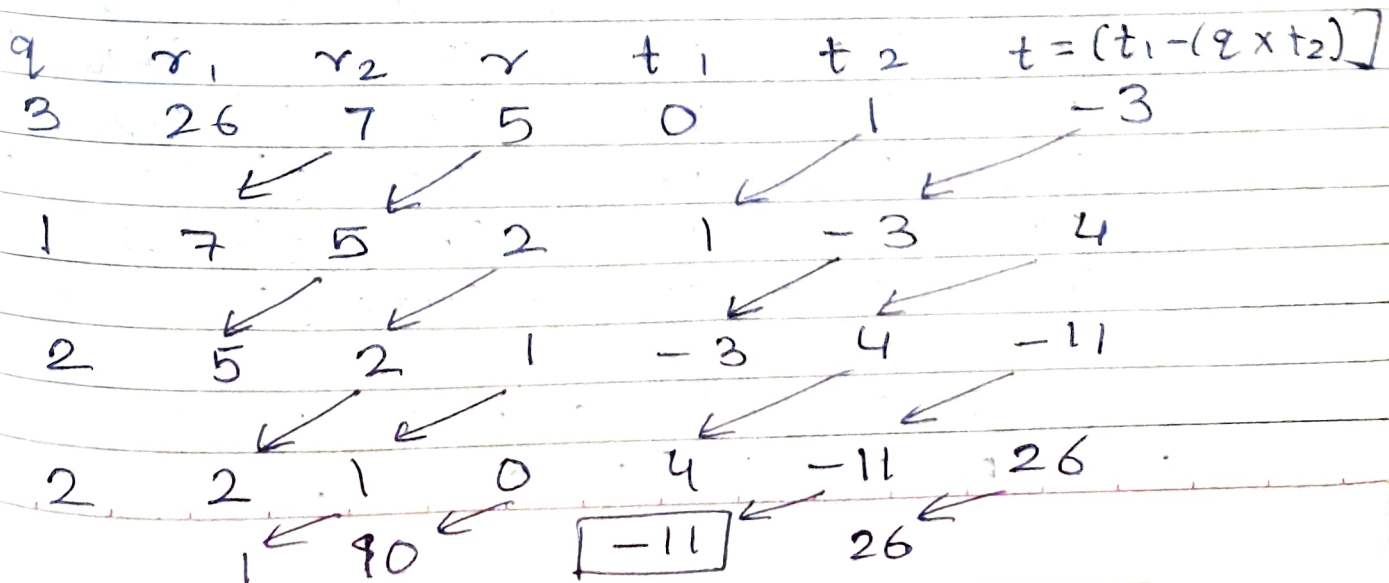
Encryption :- $C_i = [(P_i \times K_1) + K_2] \text{ mod } 26.$

$C_1 = (6 \times 7 + 9) \% 26 = 25$	$C_7 = (17 \times 7 + 9) \% 26 = 24$
$C_2 = (14 \times 7 + 9) \% 26 = 3$	$C_8 = (13 \times 7 + 9) \% 26 = 22$
$C_3 = (14 \times 7 + 9) \% 26 = 3$	$C_9 = (8 \times 7 + 9) \% 26 = 13$
$C_4 = (3 \times 7 + 9) \% 26 = 4$	$C_{10} = (6 \times 7 + 9) \% 26 = 22$
$C_5 = (12 \times 7 + 9) \% 26 = 15$	$C_{11} = (3 \times 7 + 9) \% 26 = 25$
$C_6 = (1 \times 7 + 9) \% 26 = 3$	

25 3 3 4 15 3 24 22 13 22 25
Z D D E P D Y W N W Z

C.T = ZDDEPDYNWZ.

Decryption :- $P_i = [(C_i - K_2) \times K_1^{-1}] \text{ mod } 26.$
 $K_1 = 7$; $K_1^{-1} = ?$



$$K^{-1} = -11 + 26 = 15.$$

$$P_1 = (16 \times 15) \% 26 = 6$$

$$P_2 = (-6 \times 15) \% 26 = 14$$

$$P_3 = (-6 \times 15) \% 26 = 14$$

$$P_4 = (-5 \times 15) \% 26 = 3$$

$$P_5 = (6 \times 15) \% 26 = 12$$

$$P_6 = (-6 \times 15) \% 26 = 14$$

$$P_7 = (15 \times 15) \% 26 = 17$$

$$P_8 = (13 \times 15) \% 26 = 13$$

$$P_9 = (4 \times 15) \% 26 = 8$$

$$P_{10} = (13 \times 15) \% 26 = 13$$

$$P_{11} = (16 \times 15) \% 26 = 6$$

6 14 14 3 12 14 17 13 8 13 6
G O O D M O R N I N G

P.T. = Good Morning.

Q2. P.T = AFFINE CIPHER.

Key = (7, 15).

\downarrow \downarrow
 K_1 K_2

P.T. A F F I N E C I P H E R
0 5 5 8 13 4 2 8 15 7 4 17

Encryption:- $C_i = [(P_i \times K_1) + K_2] \% 26$

$$C_1 = (0 + 15) \% 26 = 15$$

$$C_2 = (35 + 15) \% 26 = 24$$

$$C_3 = (35 + 15) \% 26 = 24$$

$$C_4 = (56 + 15) \% 26 = 19$$

$$C_5 = (91 + 15) \% 26 = 2$$

$$C_6 = (28 + 15) \% 26 = 17$$

$$C_7 = (14 + 15) \% 26 = 3$$

$$C_8 = (56 + 15) \% 26 = 19$$

$$C_9 = (105 + 15) \% 26 = 16$$

$$C_{10} = (49 + 15) \% 26 = 12$$

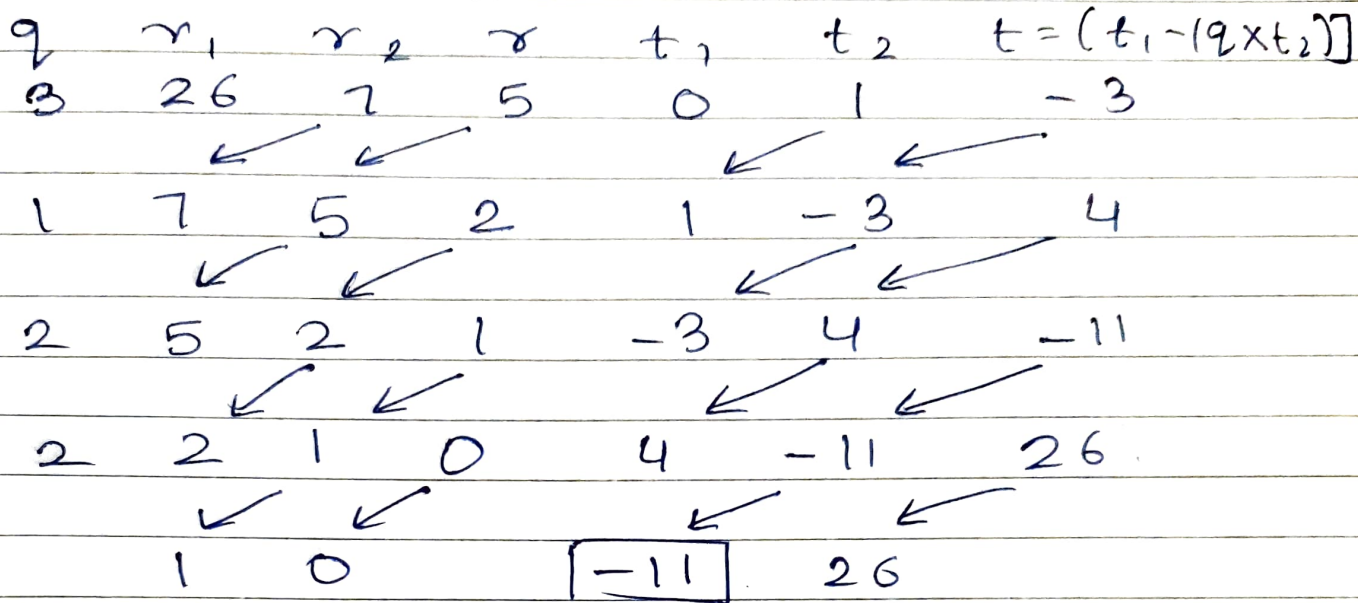
$$C_{11} = (28 + 15) \% 26 = 17$$

$$C_{12} = (119 + 15) \% 26 = 4$$

15 24 24 19 2 17 3 19 16 12 17 4
CT = P Y Y T C R D T Q M R E

C.T = P4YTCRDTQMRE.

Decryption:- $P_i = [(C_i - k_2) * K_1^{-1}] \bmod 26$.
 $K_1 = 7$, $K_1^{-1} = ?$.



$$K_1^{-1} = -11 + 26 = 15.$$

$P_1 = (0 \times 15) \% 26 = 0$	$P_7 = (-12 \times 15) \% 26 = 2$
$P_2 = (9 \times 15) \% 26 = 5$	$P_8 = (4 \times 15) \% 26 = 8$
$P_3 = (9 \times 15) \% 26 = 5$	$P_9 = (1 \times 15) \% 26 = 15$
$P_4 = (4 \times 15) \% 26 = 8$	$P_{10} = (-3 \times 15) \% 26 = 7$
$P_5 = (-13 \times 15) \% 26 = 13$	$P_{11} = (2 \times 15) \% 26 = 4$
$P_6 = (2 \times 15) \% 26 = 4$	$P_{12} = (-11 \times 15) \% 26 = 17$

0 5 5 8 13 4 2 8 15 7 4 17
 A F F I N E C I P H E R.

P.T = Affine Cipher.