

$\Delta_2$  0.7 ..... 0.7 0  
 $\Delta_3$  0.2 { 10 }  $\rightarrow$  0.3 1  
 $\Delta_1$  0.1 { 11 }

$$S = \begin{pmatrix} \Delta_1 \Delta_1 & \Delta_1 \Delta_2 & \Delta_1 \Delta_3 & \Delta_2 \Delta_1 & \Delta_2 \Delta_2 & \Delta_2 \Delta_3 & \Delta_3 \Delta_1 & \Delta_3 \Delta_2 & \Delta_3 \Delta_3 \\ 0.01 & 0.07 & 0.02 & 0.07 & 0.49 & 0.14 & 0.02 & 0.14 & 0.04 \end{pmatrix}$$

$$\begin{aligned} \bar{\ell} &= 0.49 + 2 \cdot 0.42 + \\ &+ 2 \cdot 0.28 + 0.16 + 0.1 + 0.12 + 0.06 = \\ &= 2.33 \end{aligned}$$

For orig. messages:  $\frac{\bar{L}}{2} = \frac{2.33}{2} = 1.165 \text{ b}$

b.

$$S_7 S_7 S_3 S_7 S_7 S_7 S_1 S_3 S_7 S_7$$
$$\Delta \times \mathbb{Z}^2$$

first code : 0010000111000

secret code :  $\underbrace{S7S7S3S7S7S7S1S3S7S7}_{\substack{\wedge_2 \wedge_2 \quad \wedge_3 \wedge_2 \quad \wedge_2 \wedge_2 \quad \wedge_1 \wedge_3 \quad \wedge_2 \wedge_2 \\ \wedge \quad \wedge \quad \wedge \quad \wedge \quad \wedge \\ 1 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 1 \quad 1}}$

[illegible]
$$S: \begin{pmatrix} s_1 & s_2 & s_3 & s_4 & s_5 & s_6 & s_7 & s_8 \\ 0.4 & 0.3 & 0.2 & 0.04 & 0.03 & 0.02 & 0.009 & 0.001 \end{pmatrix}$$

$s_1$     0.4   -   -   -   0.4   ,   -   -   ,   0.4    $x_1$

$$\lambda_2 \quad 0.3 \quad \dots \quad 0.3 \quad \dots \quad 0.3 \quad \lambda_2$$

$\lambda_3 \quad 0.2 \quad - \quad - \quad - \quad 0.2 \quad - \quad - \quad - \quad 0.2 \quad \lambda_3$

$$\Rightarrow 0.1 \quad \times 4$$

14 0.04 - - - 0.07  $\chi_1, \chi_2$

Ans 0.03 - - - 0.03  $\chi_1 \chi_2$

$16 \quad 0.02' - \dots - 0.02 \quad \text{X X X}$

$\rightarrow 0.009$

18 0.001  $\chi_1 \chi_2 \chi_3 \chi_4 \chi_5$

$$\Delta g \quad 0 \quad \left. \begin{array}{l} X_1, X_2, X_3 \end{array} \right\}$$

$\Delta_{10}$        $\odot$        $\times_1 \times_4 \times_4$

 $s_1 s_7 s_8 s_3 s_3 s_1$ 
$$x_4, \underbrace{x_1 x_4 x_1}_{\downarrow}, \underbrace{x_1 x_4 x_2}_{\downarrow}, \underbrace{x_3 x_3}_{\downarrow}, \underbrace{x_4}_{\downarrow}$$