

① $K = [7, 4]$

$c = 0010abc$

$$H^T = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

$S = [000]$

$c \cdot H^T = [000]$

$1 + a + c = 0$

$a + c = 1 \rightarrow \boxed{c = 0}$

$1 + b + c = 0$

$b + c = 1 \rightarrow \boxed{b = 1}$

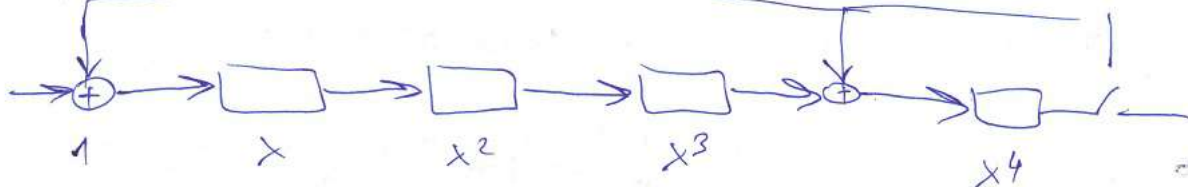
$a + b + c = 0$

$\rightarrow \boxed{a = 1}$

$\boxed{a = b}$

ODGOVOR: (D)

③



$$g(x) = x^4 + x^3 + 1 \rightarrow \left. \begin{matrix} n=15 \\ r=4 \end{matrix} \right\} k=11$$

$d = 10101010110$

$r(x) = (x^{10} + x^8 + x^6 + x^4 + x^2 + x) - x^4 \bmod g(x)$

(odmah
oduzman
i pišem
samo
rezultat
s koefi-
cijentima)

$$\begin{aligned} & \cancel{x^{14}} + \cancel{x^{12}} + \cancel{x^{10}} + x^8 + x^6 + x^5 \quad ; \quad x^4 + x^3 + 1 = x^{10} + x^9 + x^5 + x^2 + x + 1 \\ & \cancel{x^{13}} + \cancel{x^{11}} + \cancel{x^9} + x^8 + x^6 + x^5 \\ & \quad \quad \quad \cancel{x^9} + \cancel{x^8} + x^6 + \cancel{x^5} \\ & \quad \quad \quad \quad \quad \quad \cancel{x^8} \\ & \quad \quad \quad \quad \quad \quad \quad \quad \quad \cancel{x^5} + x^2 \\ & \quad \quad \quad \quad \quad \quad \quad \quad \quad \cancel{x^4} + x^2 + x \\ & \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad x^3 + x^2 + x + 1 \end{aligned} \Rightarrow \text{CRC} = 1111$$

ODGOVOR: (A)

② A

$$G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

$$G^* = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 & 1 \end{bmatrix}$$

(dodano
paritetni bit
prije bita najmanje
značajnosti



(shift desno)

$$H^* = [A^T | I]$$

$$H^* = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

$$G^* = [I | A]$$

H^T

$$H^T = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$c = 10101110$$

$$S = c \cdot H^T = [1011]$$

ODGOVOR: (B)

④. $\frac{1}{17}$

n	k	$R = \frac{k}{n}$
9	5	0,56
10	6	0,6
11	7	0,63
12	8	0,67
13	9	0,69
14	10	0,71
15	11	<u>0,73</u>
16	11	0,69
17	12	0,71

[15, 11]

11 podat. bitova

11101010110

x1x110x1010110

1-1-1-0-1-1-1-0

01--10--01--10

0110----0110

01010110

$$TEZ/NA = 8$$

ODGOVOR: (B)



101011001010110

⑤. $H = [15, 11]$

$P = [12, 11]$

$$ODJER = \frac{\binom{15}{0} m^0 (1-m)^{15} + \binom{15}{1} m^1 (1-m)^{14}}{\binom{12}{0} m^0 (1-m)^{12}}$$

$$= \frac{(1-m)^{15} (1+14m)}{(1-m)^{12}} = \frac{(1+14m)(1-m)^2}{1}$$

ODGOVOR (C)

6.

$$H = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 \end{bmatrix}$$

$$p = 1110$$

$$c = p \cdot H = [0 \ 1 \ 1 \ 1 \ 1 \ 0 \ 1]$$

ODGOVOR: (B)

7.

$$H = [6, 3] \quad c = 100011$$

$$H^T = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$$

$$s = c \cdot H^T = [0 \ 1 \ 0]$$

2. bit = pogreška

$$c = 110011 \quad (\text{poslano})$$

G je $[I | A]$, pa je poslana poruka $[110]$

$$p_{isp} = \binom{6}{0} p_g^0 (1-p_g)^6 + \binom{6}{1} p_g^1 (1-p_g)^5$$

$$= (1-p_g)^5 (1+5p_g) = 0,9985$$

ODGOVOR: (D)

8.

$$K = \begin{bmatrix} 0000 \\ 1011 \\ 1110 \\ 0101 \end{bmatrix}$$

$$G = \begin{bmatrix} 1011 \\ 0101 \end{bmatrix} \quad [I|A]$$

$$H = [A^T | I] = \begin{bmatrix} 1010 \\ 1101 \end{bmatrix}$$

$$K^\perp = \begin{bmatrix} 0000 \\ 1010 \\ 1101 \\ 0111 \end{bmatrix}$$

\Rightarrow odgovara

odgovoru: (D)

9.

$$K = \begin{bmatrix} 1110100 \\ 1101001 \\ 1010011 \\ 0100111 \\ 1001110 \\ 0011101 \\ 0111010 \end{bmatrix}$$

$$n=7$$

$$r=4$$

$$k=3$$

0011101 (4 je stupnja 4)

$$g(x) = x^4 + x^3 + x^2 + 1$$

$$G = \begin{bmatrix} 1110100 \\ 0111010 \\ 0011101 \end{bmatrix}$$

$$p = 011$$

$$c = p \cdot G$$

$$c = [0100111] \Rightarrow \text{odgovor: (C)}$$

(10.)

000000 - 111111

$k=6$

$n=10$

0001001010

$H^T =$

1	0	0	0
0	1	0	0
1	1	0	0
0	0	1	0
1	0	1	0
0	1	1	0
1	1	1	0
0	0	0	1
1	0	0	1
0	1	0	1

$S = [0101] \Rightarrow 10$ bit LRV

$c = \cancel{0001001010}$

$d = 0001111$ answer: (B)

m

m