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NPTEL

Courses » Information Theory, Coding and Cryptography

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Unit 10 - Week 9

Assignment 9

The due date for submitting this assignment has passed.
As per our records you have not submitted this **Due on 2018-10-03, 23:59 IST.**
assignment.

1) The constraint length of a shift register encoder is defined as   **1 point**

- ○ The number of input symbols in one information fram
- ○ The number of symbols it can store in its memory
- ○ The number of symbols in one codeword frame
- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
The number of symbols it can store in its memory

2) For a non-catastrophic convolutional code with generator polynomials g1(D), g2(D), ...   **1 point**
$gn_0(D)$,   we have

- ○ $GCD[g1(D), g2(D), ...,gn_0(D)\ ] = x^a$ for some a
- ○ $GCD[g1(D), g2(D), ...,gn_0(D)\ ] = 1$
- ○ both a. and b
- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
both a. and b

3) The encoding operation for convolutional codes can be described as   **1 point**

- ○ $C(D) = I(D)\mathbf{G}^T(D)$
- ○ $C(D) = I(D) / \mathbf{G}(D)$

*C(D) = I(D)**G(D)***

4) The encoded bit stream corresponding to the input bit stream: 1 1 1 1 0 0 0 0 … using the   **1 point**
convolutional encoder given below is
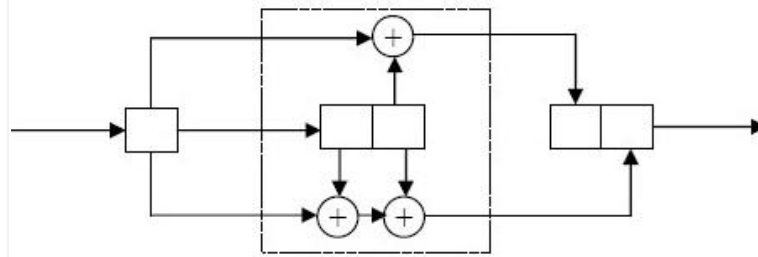
○ 11 11 01 11 10 11 00 01 …

○ 10 10 01 01 10 11 01 01 …

○ 10 00 01 00 10 11 00 00 …

○ 11 10 01 01 10 11 00 00 …

No, the answer is incorrect.
Score: 0

Accepted Answers:
11 10 01 01 10 11 00 00 …

5) A message stream is encoded using the convolutional encoder given in the previous   **1 point**
problem, and then transmitted. Let the received word (with errors) be r = 10 11 11 01 10 01 11 10 …
Then the transmitted sequence is

○ 11 11 11 01 10 01 11 00 …

○ 10 01 11 11 10 11 11 00 …

○ 10 01 11 10 10 11 10 00 …

○ 10 01 11 00 10 01 11 00 …

No, the answer is incorrect.
Score: 0

Accepted Answers:
10 01 11 00 10 01 11 00 …

6) In a Trellis diagram, the horizontal axis represents   **1 point**

○ Continuous time

○ Discrete time

○ Symbol frequency

○ Symbol duration

No, the answer is incorrect.
Score: 0

Accepted Answers:
Discrete time

7) The rate of the encoder with G(D) = [$D^5 + D^3 +1$ $D^4 + 1$ $D^3 + 1$]   **1 point**

○ 1/2

○ 1/3

○ 1/4

○ 2/3

No, the answer is incorrect.
Score: 0

Accepted Answers:
1/3

8)

$$Given \ \ G(D) = \begin{bmatrix} 1 & 0 & \dfrac{D^2}{1+D^3} \\ 0 & 1 & \dfrac{D}{1+D^3} \end{bmatrix} \ \ the \ H(D) \ will \ be$$

1 point

- ○ **H**(D) = [D^2 D   1 + D^3]
- ○ **H**(D) = [D   1   1 + D^2]
- ○ **H**(D) = [D^3 D^2 1 + D^3]
- ○ **H**(D) = [D^2 D   1 + D]

No, the answer is incorrect.
Score: 0

Accepted Answers:
H(D) = [D^2 D   1 + D^3]

9) The free distance, d_{free}, for the trellis with T(D) = $2D^6 + 8D^8 + 14D^{10} + ...$ is   *1 point*

- ○ 4
- ○ 5
- ○ 6
- ○ 7

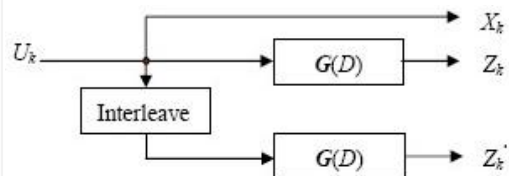**No, the answer is incorrect.**
Score: 0

Accepted Answers:
6

10) Consider the Turbo encoder for in 3GPP-LTE given below with the transfer function of the   *1 point*
8-state constituent code for parallel concatenated convolutional code given by G(D) =

$$= \begin{bmatrix} 1 & \dfrac{g_1(D)}{g_0(D)} \end{bmatrix}$$

where, g0(D) = $1 + D^2 + D^3$ and g1(D) = $1 + D + D^3$. Let the interleaver be 'flip all bits'. The encoded
the bit stream corresponding to the input 0 0 1 1 0 1 1 0 ... using this Turbo encoder will be

- ○ 101 010 111 110 010 101 110 101 ...
- ○ 000 011 110 010 010 101 010 001 ...
- ○ 001 010 110 110 010 101 110 001 ...
- ○ 111 010 111 100 010 101 110 011 ...

No, the answer is incorrect.
Score: 0

Accepted Answers:
001 010 110 110 010 101 110 001 ...

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