Assignment 9

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

1) The constraint length of a shift register encoder is defined as
   - The number of input symbols in one information frame
   - 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 $g_1(D), g_2(D), \ldots, g_n(D)$, we have
   - $\text{GCD}(g_1(D), g_2(D), \ldots, g_n(D)) = x^a$ for some $a$
   - $\text{GCD}(g_1(D), g_2(D), \ldots, g_n(D)) = 1$
   - 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
   - $C(D) = I(D)G(D)$
   - $C(D) = I(D)G^T(D)$
   - $C(D) = I(D)G(D) + G(D)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
4) The encoded bit stream corresponding to the input bit stream: 1 1 1 0 0 0 0 … using the 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 10 11 00 00 ...

5) A message stream is encoded using the convolutional encoder given in the previous 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 10 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

```
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 \( G(D) = [D^5 + D^3 + 1 \quad D^4 + 1 \quad D^3 + 1] \)

```
1/2
1/3
1/4
2/3
```
8) Given $G(D) = \begin{bmatrix} 1 & 0 & \frac{D^2}{1 + D^2} \\ 0 & 1 & \frac{1}{1 + D^2} \end{bmatrix}$ the $H(D)$ will be

- $H(D) = [D^2 \quad D \quad 1 + D^2]$
- $H(D) = [D \quad 1 \quad 1 + D^2]$
- $H(D) = [D^3 \quad D^2 \quad 1 + D^2]$
- $H(D) = [D^2 \quad D \quad 1 + D]$

No, the answer is incorrect.
Score: 0
Accepted Answers: 1/3

9) The free distance, $d_{\text{free}}$, for the trellis with $T(D) = 2D^6 + 8D^8 + 14D^{10} + \ldots$ is

- 4
- 5
- 6
- 7

No, the answer is incorrect.
Score: 0
Accepted Answers: 6

Consider the Turbo encoder for in 3GPP-LTE given below with the transfer function of the 8-state constituent code for parallel concatenated convolutional code given by $G(D) = \begin{bmatrix} g_0(D) \\ g_1(D) \end{bmatrix}$ where, $g_0(D) = 1 + D^2 + D^3$ and $g_1(D) = 1 + D + D^2$. Let the interleaver be ‘flip all bits’. The encoded 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 ...