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NPTEL

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Courses » Error Control Coding: An Introduction to Convolutional Codes

Announcements Course Ask a Question Progress Mentor

## Unit 2 - Week-1

### Course outline

#### How to access the portal

#### Week-1

- Introduction to Error Coding-I
- Introduction to Error Coding-II
- Introduction to Error Control Coding-III
- Introduction to Convolutional Codes-I: Encoding
- Introduction to Convolutional Codes-II: State Diagram, Trellis Diagram

Quiz : Assignment 1

Assignment-1 Solutions

#### Week-2

#### Week-3

#### Week-4

## Assignment 1

The due date for submitting this assignment has passed. **Due on 2016-03-24, 23:55 IST.**

### Submitted assignment

Covers the theory based on first week lectures

1) Which of the following is an example of source coding? 1 point

- Huffman code
- Repetition code
- Parity check code
- None of the above

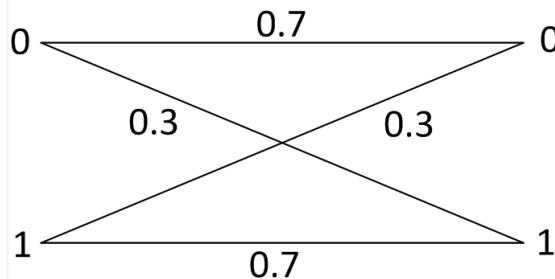
**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Huffman code*

2) If an information source emits "1" and "0" with equal probability and the bit is transmitted through BSC, what is the probability of received sequence '01'? 1 point



- 0.125
- 0.25
- 0.5
- 1

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*0.25*

3) A repetition code of length 7 has 1 point

- 5 codewords
- 7 codewords
- 2 codewords
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

2 codewords

4) 1/3 repetition code is able to

1 point

- detect single error
- detect double error
- correct single error
- All of above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of above

5) For (2,1,3) convolutional code, the generator sequences are given as

1 point

$g^{(0)} = (1\ 1\ 0\ 1)$ ,  $g^{(1)} = (1\ 0\ 0\ 1)$ . Find the generator matrix (G)?

$$\begin{bmatrix} 10 & 11 & 00 & 11 & & \\ & 11 & 10 & 00 & 11 & \\ & & 11 & 10 & 00 & 11 \\ & & & \ddots & \ddots & \ddots \end{bmatrix}$$

$$\begin{bmatrix} 11 & 10 & 01 & 11 & & \\ & 11 & 10 & 01 & 11 & \\ & & 11 & 10 & 01 & 11 \\ & & & \ddots & \ddots & \ddots \end{bmatrix}$$

$$\begin{bmatrix} 11 & 10 & 00 & 11 & & \\ & 11 & 10 & 00 & 11 & \\ & & 11 & 10 & 00 & 11 \\ & & & \ddots & \ddots & \ddots \end{bmatrix}$$

None of above

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\begin{bmatrix} 11 & 10 & 00 & 11 & & \\ & 11 & 10 & 00 & 11 & \\ & & 11 & 10 & 00 & 11 \\ & & & \ddots & \ddots & \ddots \end{bmatrix}$$

6) Given a (2, 1, 3) convolutional code with generator sequences

1 point

$g^{(0)} = (1\ 0\ 1\ 0)$ ,  $g^{(1)} = (1\ 0\ 1\ 1)$  and the convolutional encoder is initially at all zero state. If the input sequence  $u$  is (1 1 0 1 1) then what will be the encoded output sequence?

- (11, 10, 11, 01, 10,.....)
- (11, 11, 10, 01, 10,.....)
- (11, 11, 11, 01, 10,.....)
- None of above

No, the answer is incorrect.

Score: 0

Accepted Answers:

(11, 11, 11, 01, 10,.....)

7) The generator sequences for rate  $R=1/2$  convolutional code are  $g_0(D) = 1 + D^2$ ,  $g_1(D) = 1 + D + D^2$ . If the input sequence  $u$  is (0 1 1 1 0) then the output sequence is 1 point

- (00, 11, 10, 01, 10,.....)
- (00, 11, 10, 01, 11,.....)
- (01, 10, 10, 01, 10,.....)
- None of above

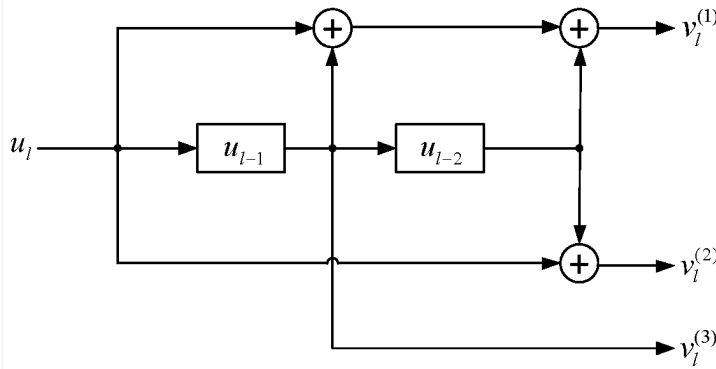
No, the answer is incorrect.

Score: 0

Accepted Answers:

(00, 11, 10, 01, 10,.....)

8)



1 point

For the above convolutional encoder the value of (n, k, m) is

- (2, 3, 1)
- (1, 2, 3)
- (3, 2, 1)
- (3, 1, 2)

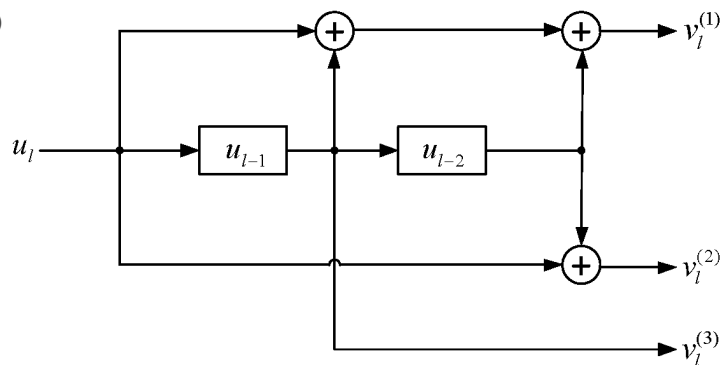
No, the answer is incorrect.

Score: 0

Accepted Answers:

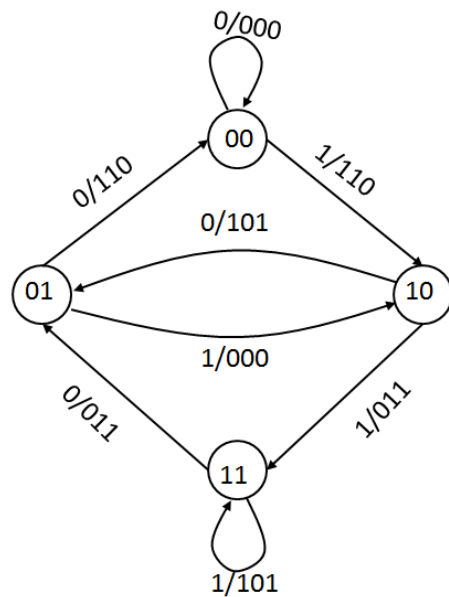
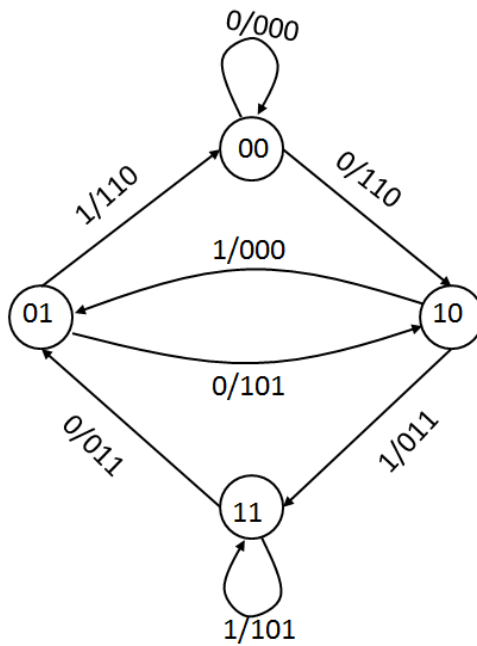
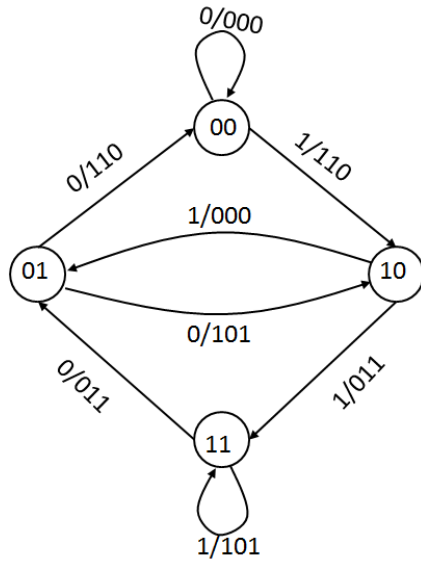
(3, 1, 2)

9)



1 point

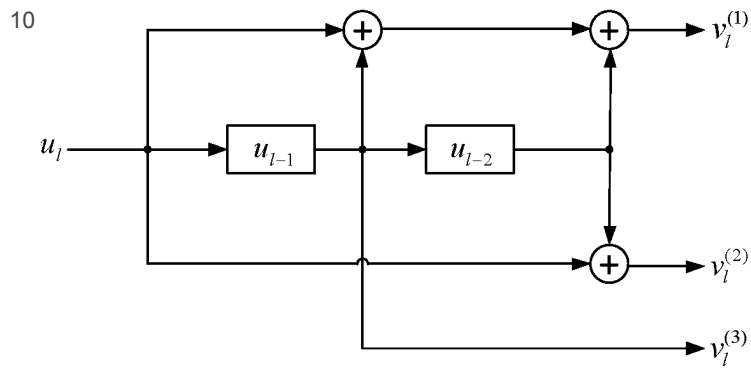
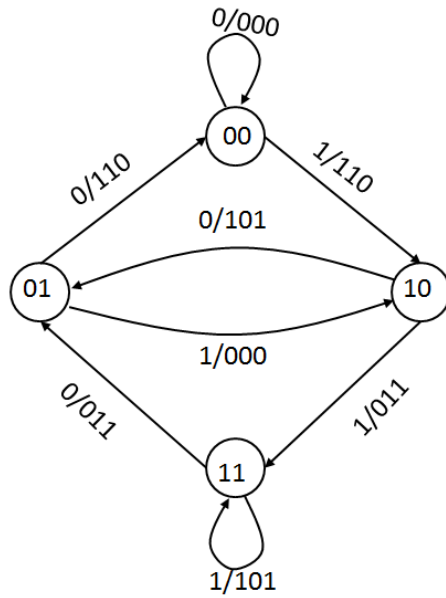
State diagram of the above encoder is



None of above

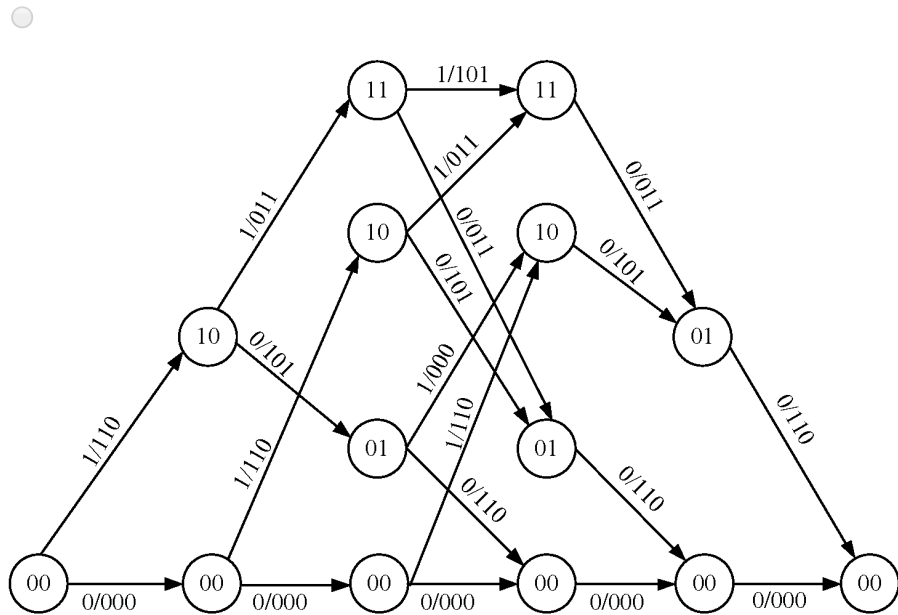
**No, the answer is incorrect.**  
**Score: 0**

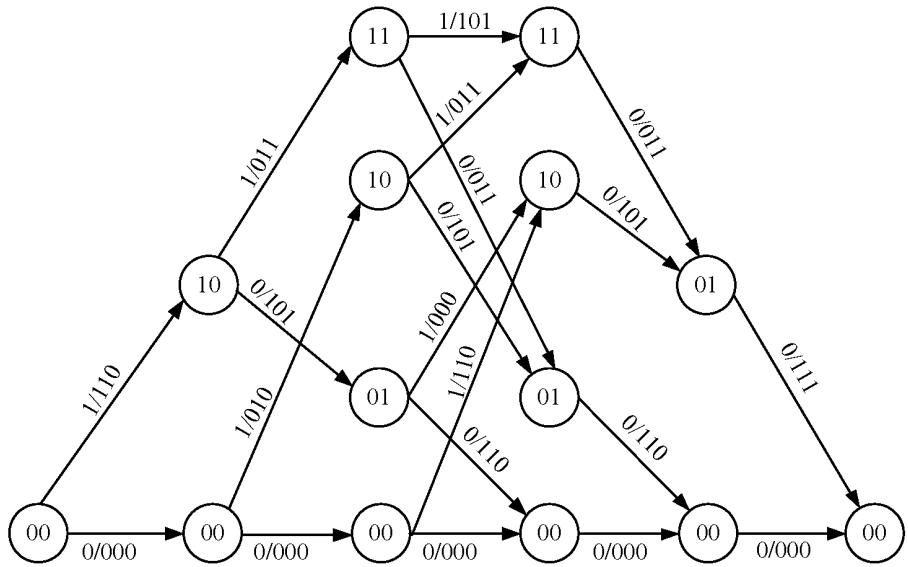
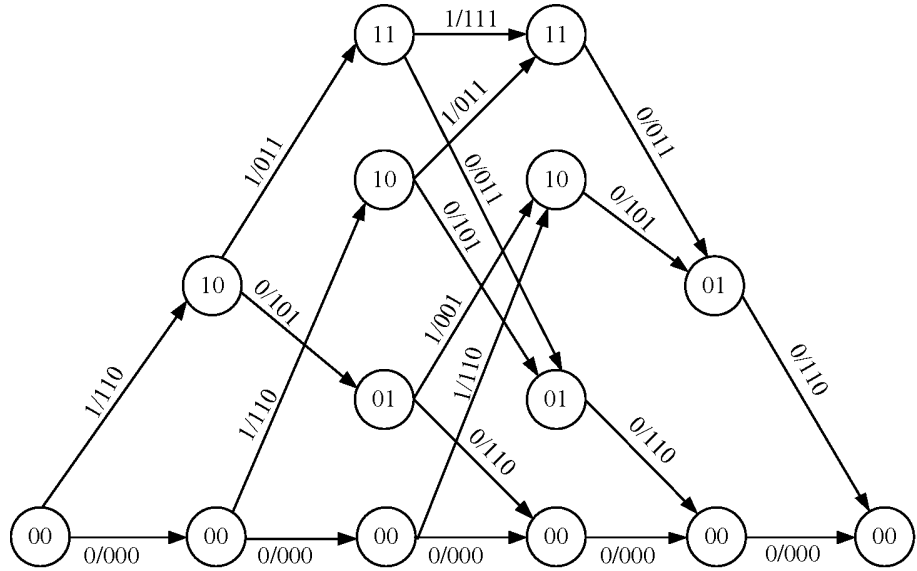
Accepted Answers:



1 point

The trellis diagram of above encoder is



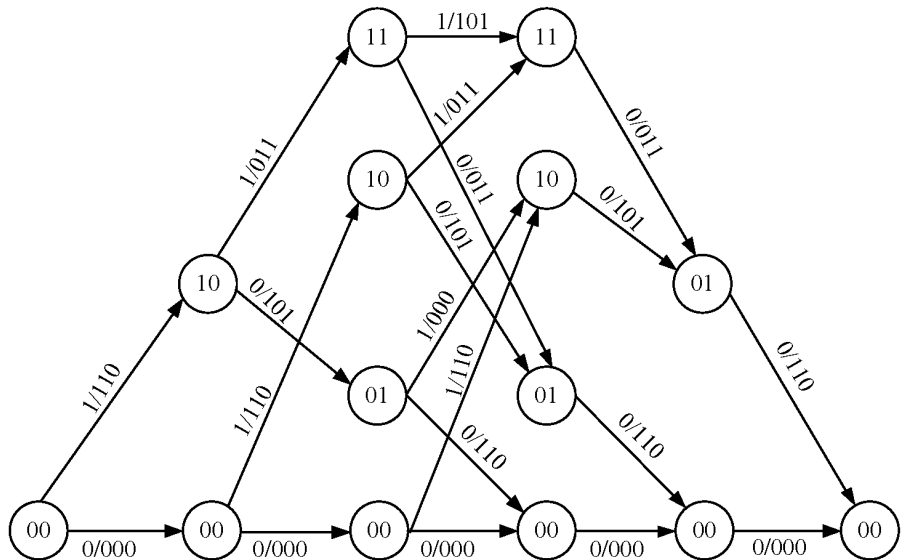


- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:



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