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### Courses » Error control coding: An introduction to linear block code

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## Unit 4 - Week-3

### Course outline

How to access the portal

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### Week-3

- Some Simple Linear Block Codes-I
- Some Simple Linear Block Codes-II: Reed Muller Codes
- Bounds on the Size of a Code
- Problem Solving Session-III
- Quiz : Assignment-3
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Week-4

# **Assignment-3**

The due date for submitting this assignment has passed. Due on 2016-04-05, 23:55 IST.

### Submitted assignment

Assignment for Week-3

1) Let  $C_1$ ,  $C_2$  be two codes defined by generator matrices

1 point

1) Let 
$$C_1$$
,  $C_2$  be two codes defined by generator matrices 
$$G_1 = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix} \text{ and } G_2 = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 \end{bmatrix} \text{respectively. Is } C_1 |$$

dual code of  $C_2$ ?

- True
- False

No, the answer is incorrect.

Score: 0

**Accepted Answers:** 

True

2) All linear  $\left(n, \frac{n}{2}\right)$  block codes are self dual codes?

1 point

- True
- False

No, the answer is incorrect.

Score: 0

**Accepted Answers:** 

False

3) An information sequence is encoded using (7,4) Hamming code. A codeword r = (0101011) 1 point is received which has single error in it. The bit location of single error is

- First bit
- Third bit
- Fifth bit
- Seventh bit

No, the answer is incorrect.

Score: 0

**Accepted Answers:** 

Seventh bit

4) A code derived from (15,11) Hamming code is described by following parity check matrix H. 1 point This is an example of.

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- Extended Hamming Code
- Expurgated Hamming Code
- Shortened Hamming Code
- None of the above

No, the answer is incorrect.

Score: 0

### **Accepted Answers:**

Shortened Hamming Code

- 5) An information sequence is encoded using (7,6) Single Parity Check (SPC) code. Received **1 point** sequence was 1100011. Which of the following statement is true?
  - (a) No error occurred
  - (b) Even number of errors occurred
  - Odd number of errors occurred
  - Either of (a) and (b)

No, the answer is incorrect.

Score: 0

### **Accepted Answers:**

Either of (a) and (b)

6) Generator matrix of Reed Muller RM(1,3) code is given by

1 point

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

| $\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
|--|---|---|---|---|---|---|---|
| 0  | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 0  | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 0  | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

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

None of the above

No, the answer is incorrect.

Score: 0

### **Accepted Answers:**

| 1 | 1 | 1 | 1 | 1 | 1 | 1<br>0<br>1<br>1 | 1 |
|---|---|---|---|---|---|------------------|---|
| 0 | 1 | 0 | 1 | 0 | 1 | 0                | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1                | 1 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1                | 1 |

7) Reed Muller RM(1,3) code

1 point

- Can correct single errors
- Can correct double errors
- Can simultaneously detect and correct double errors
- None of the above

| No, the answer is incorrect. Score: 0   |         |
|---|---------|
| Accepted Answers: Can correct single errors   |         |
| 8) Which of the following is an example of <b>perfect</b> code?   | 1 point |
| <ul> <li>(7, 3, 3)</li> <li>(7, 4, 3)</li> <li>(7, 5, 3)</li> <li>None of the above</li> </ul>                |         |
| No, the answer is incorrect. Score: 0   |         |
| Accepted Answers: (7, 4, 3)   |         |
| 9) Which of the following is an example of maximum distance separable (MDS) code?                             | 1 point |
| <ul> <li>(7, 4, 4)</li> <li>(7, 5, 3)</li> <li>(7, 6, 2)</li> <li>None of the above</li> </ul>                |         |
| No, the answer is incorrect. Score: 0   |         |
| Accepted Answers: (7, 6, 2)   |         |
| 10)Which of the following is a valid binary linear block code?  | 1 point |
| <ul> <li>(a) (7, 5, 3)</li> <li>(b) (7, 4, 4)</li> <li>Both (a) and (b)</li> <li>None of the above</li> </ul> |         |
| No, the answer is incorrect. Score: 0   |         |
| Accepted Answers: None of the above   |         |

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