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# Unit 6 - Week 5



## Assignment 5

**The due date for submitting this assignment has passed.**
**As per our records you have not submitted this assignment.** **Due on 2018-09-12, 23:59 IST.**

1) A linear code has the following properties ***1 point***

- The sum of two codewords belonging to the code is also a codeword belonging to the code
- The all-zero codeword is always a codeword
- The minimum Hamming distance between two codewords of a linear code is equal to the minimum weight of any non-zero codeword, i.e., d*= w*
- All of the above

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

**Accepted Answers:**
*All of the above*

2) Which statement of incorrect about Galois Fields ***1 point***

- The number of elements must be a power of prime
- Two Galois Fields with the same number of elements are isomorphic
- Every Galois Field has at least one element $\alpha$, called a primitive element, such that all other elements (except 0) can be expressed as a power of $\alpha$.
- If $p$ is a prime number and $\alpha$ is a primitive element, then with $\alpha^p = 1$

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

**Accepted Answers:**
*If p is a prime number and α is a primitive element, then with $\alpha^p = 1$*

3) ***1 point***

Consider the generator matrix $G = \begin{bmatrix} 1 & 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 1 \end{bmatrix}$. The $(n, k)$ are

Lectures

(7, 1)

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

**Accepted Answers:**
*(7, 3)*

4) ***1 point***

Using the Hamming code given by $G = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \end{bmatrix}$, upon encodeing the input message vectors m = 1010 we obtain the codeword

- 0110010
- 1110010
- 1010010
- 1110011

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

**Accepted Answers:**
*1110010*

5) How many errors can be corrected using the (15, 11) linear block codewhose parity check matrix is given below ***1 point***

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

- 0
- 1
- 2
- 3

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

**Accepted Answers:**
*1*

6) The Hamming weight of the vector [♦ 0 0 ◊♣♥ 0 ♠ 0 ◊♥] is ***1 point***

- 5
- 6
- 7
- 8

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

**Accepted Answers:**
*7*

7) The generator matrix for the binary repetition code of length 5 is ***1 point***

- G = [1 0 0 0 0]
- G = [1 0 1 0 1]
- G = [0 1 0 1 0]
- G = [1 1 1 1 1]

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

**Accepted Answers:**
*G = [1 1 1 1 1]*

8) Let u = [$u_1$ , $u_2$ , • • • , $u_n$ ], v = [$v_1$ , $v_2$ , • • • , $v_n$ ] and w = [$w_1$ , $w_2$ , • • • , $w_n$ ] be binary n-tuples. Which of the following is true: ***1 point***

- d(u, v) = w(u + v)
- d(u, v) ≤ d(u, w) + d(w, v)
- w(u + v) ≥ w(u) - w(v)
- All of the above

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

**Accepted Answers:**
*All of the above*

9) Let G1, G2be the generator matrices for two linear codes (n1, k) and (n2, k) respectively. Then, the parameters (n, k) for the code with G = [G1 | G2 ] will be ***1 point***

- (($n_1$+$n_2$), k)
- (min($n_1$, $n_2$), k)
- (max($n_1$, $n_2$), k)
- (($n_1$+$n_2$), 2k)

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

**Accepted Answers:**
*(($n_1$+$n_2$), k)*

10) Suppose C is a binary linear code. The code obtained by adding an overall parity check bit to C will be a ***1 point***

- Non linear code
- Linear code
- Systematic code
- None of the above

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

**Accepted Answers:**
*Linear code*

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