

## Course outline

How does an NPTEL online course work?

Week 0

Week 1

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Week 11

● Lecture 22: Introduction to various linear explicit codes

● Lecture 23: Introduction of efficient decoding

○ Quiz : Assignment 11

● Assignment 11 Solution

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Week 12

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# Assignment 11

The due date for submitting this assignment has passed.

**Due on 2021-04-07, 23:59 IST.**

As per our records you have not submitted this assignment.

1) Recall the Gilbert-Varshamov bound of Error Correcting Code (ECC). For all  $\delta \in (0, 1)$ ,  $c = 2$ , and large enough  $n$ , there exists ECC :  $\{0, 1\}^n \rightarrow \{0, 1\}^{cn/(1-H(\delta))}$  of distance  $\delta$ . For what other values of  $c$  the bound would still hold? **1 point**

- For any real  $c$  smaller than 1
- for any  $c$  in  $(1,2)$
- for any  $c$  greater than or equal to 2
- The bound does not hold for any value other than  $c=2$ .

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
for any  $c$  greater than or equal to 2

2) We say an Error Correcting Code  $E: \{0, 1\}^n \rightarrow \{0, 1\}^m$  is linear if there exists an  $m \times n$  matrix  $A$  such that  $E(x) = Ax$ . Which of the following error correcting codes studied in the course are linear? **1 point**

- Walsh-Hadamard code.
- Reed-Solomon code.
- Reed-Muller code.
- All of the above.

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
All of the above.

3) Let  $p(x)$  be a polynomial of degree 3 such that  $p(1)=1, p(2)=2, p(3)=3, p(4)=4$ . What is the value of  $p(6)$ ? **1 point**

- 0
- 1
- 6
- 16

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
16

4) Let  $P$  be a  $n$ -variate degree- $d$  polynomial with sparsity (i.e. number of monomials)  $m$ . Let  $S$  be a finite set of positive numbers. Then, what is the best known upper bound on the probability that  $P(s)=0$  for some  $s$  in  $S$ ? **1 point**

- $d/|S|$
- $mn/|S|$
- $mnd/|S|$
- $m/|S|$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $mn/|S|$