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NPTEL

Courses » **Information Theory, Coding and Cryptography**

Announcements   **Course**   Ask a Question   Progress   Mentor   FAQ

Unit 1 - How to access the portal

Course outline

How to access the portal

- How to access the home page?

- How to access the course page?

- How to access the MCQ, MSQ and Programming assignments?

- Quiz : Assignment 0

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Assignment 0

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.   **Due on 2018-07-30, 23:59 IST.**

1) For matrices A and B, pick the correct choice   *1 point*

- ○ $(A + B)^T = A^T + B^T$
- ○ $(aA)^T = aA^T$
- ○ $(AB)^T = B^T A^T$
- ○ All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

2) A matrix A is said to be invertible if there exists a matrix B such that   *1 point*

- ○ $BA = AB = I$
- ○ $B^T A = AB^T$
- ○ $BA^T = I$
- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
$BA = AB = I$

3) The inverse of a square matrix A is denoted by A^{-1} where   *1 point*

- ○ $A^{-1} A^{-1} = I$
- ○ $A A^{-1} = I$

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$$A\,A^{-1} = I$$

4) The column rank of A is the   *1 point*

- ○ number of linearly dependent column vectors in the matrix A

- ○ number of linearly independent column vectors in the matrix A

- ○ number of linearly dependent row vectors in a matrix A

- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
number of linearly independent column vectors in the matrix A

5) Hermitian of a matrix A is defined as   *1 point*

- ○ $A^H = (A)^T$

- ○ $A^H = (A^{-1})^T$

- ○ $A^H = (A^*)^{-1}$

- ○ $A^H = (A^*)^T$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$A^H = (A^*)^T$

6) For a unitary matrix U   *1 point*

- ○ $U^H U = I$

- ○ The rows, as well as the columns, of U form an orthogonal set

- ○ All eigenvalues have absolute value 1

- ○ All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

7) Let $X_1, X_2, \ldots, X_n$ be continuous random variables with cumulative   *1 point*
distribution functions $F_1(x), F_2(x), \ldots, F_n(x)$ and with density functions $f_1(x)$,
$f_2(x), \ldots, f_n(x)$ respectively. Then, these random variables are mutually
independent if

- ○ $F(x_1, x_2, \ldots, x_n) = F_1(x)F_2(x) \ldots F_n(x)$

- ○ $f(x_1, x_2, \ldots, x_n) = f_1(x)f_2(x) \ldots f_n(x)$

- ○ Both a and b

- ○ None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both a and b

8) The variance of a random variable X, with mean μ, is defined as   *1 point*

- ○ E[X]– μ

○ $E[X^2]- (\mu)^2$

○ $E[X^2]+ (\mu)^2$

○ $E[X^2]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$E[X^2]- (\mu)^2$

9) The Gaussian distribution is given by   *1 point*

○ $f(x) = \begin{cases} \lambda e^{-\lambda x}, & \text{if } 0 \leq x < \infty \\ 0, & \text{otherwise} \end{cases}$

○ $f(x) = \dfrac{x}{\sigma^2} e^{-x^2/2\sigma^2}$

○ $f(x) = \dfrac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2}$

○ $f(x) = \begin{cases} \dfrac{1}{b-a}, & \text{if } a \leq x \leq b \\ 0, & \text{otherwise} \end{cases}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$f(x) = \dfrac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2}$$

10) Which of the following is a reference book for this course   *1 point*

○ R. Bose, *Information theory, coding and cryptography*, McGraw-Hill, 3rd Edition, 2016.

○ T.M. Cover and J. A. Thomas, *Elements of information theory*, John Wiley & Sons, 2012.

○ T. K. Moon, *Error Correction Coding: Mathematical Methods and Algorithms*, Wiley, 2005

○ All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

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