Unit 13 - Week 12

Assignment 12

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-10-23, 23:59 IST.

1) Which of the following is/are the benefit(s) of a MIMO system? *1 point*

- Increased capacity
- Diversity benefit
- Both (a) and (b)
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both (a) and (b)

2) Consider a MIMO system in which the channel transfer matrix (H) is known. Which of the following methods can be used if H is not a square matrix? *1 point*

- Matrix inversion
- Singular value decomposition
- Matrix conjugate
- Matrix transpose

No, the answer is incorrect.
Score: 0
Accepted Answers:
Singular value decomposition

3) Which of the following is/are the assumption(s) made in a MIMO system? *1 point*

- The elements of channel transfer matrix (H) are zero mean complex Gaussian values
- The noise elements are complex additive white Gaussian with zero mean
- The transmitted signal (X) elements are zero mean complex Gaussian values
- All of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
All of the above

4) Which of the following is/are true regarding the power allocation in a MIMO system? *1 point*

- Channels with better SNR get higher power allocation
- Channels with poor SNR get higher power allocation
- Channel state information at the transmitter is required for optimum power allocation
- Both (a) and (c)

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both (a) and (c)

5) What is the best strategy for power allocation if all the channels have poor SNR? *1 point*

- Allocate all the power to the channel with the best SNR and zero power to the other channels
- Allocate equal power to all the channels
- Both (a) and (b)
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Allocate all the power to the channel with the best SNR and zero power to the other channels

6) Which is the relation between Capacity and Mutual Information of a channel? *1 point*

- Capacity is always >= MI
- Capacity is always <= MI
- They are one and the same
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
Capacity is always >= MI

7) Consider a 16-QAM transmitter where all the symbols are equi-likely. What is the Entropy of the source in terms of number of bits per channel use? *1 point*

- 0.25
- 8
- 0.125
- 4

No, the answer is incorrect.
Score: 0
Accepted Answers:
4

8) What is the entropy in the above problem, if four of the 16-QAM symbols are transmitted twice as frequently as the other two symbols? *1 point*

- 3.92
- 1.467
- 4
- 0.548

No, the answer is incorrect.
Score: 0
Accepted Answers:
3.92

9) What is the entropy of a variable with Gaussian distribution with mean μ and Variance? *1 point*

- $\mu + log_2(\pi e \sigma^2)$
- $0.5^* log_2(2\pi e \sigma^2)$
- $0.5^* log_2[\pi e(\sigma + \mu)^2]$
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
$0.5^* log_2(2\pi e \sigma^2)$

10) Which of the following is NOT true about HH*, where H is the channel transition matrix, '*' is the Hermitian operator. *1 point*

- HH* is a square matrix
- HH* is positive semi-definite
- HH* = H*H
- HH* = (HH*)*

No, the answer is incorrect.
Score: 0
Accepted Answers:
HH = H*H*