Assignment 12

1) Which of the following ideas were the breakthroughs of the MIMO system? Which of the following ideas were not correct? 
(a) Higher capacity
(b) Diversity
(c) Orthogonality
(d) None of the above

No, the answer is incorrect. None of the above.

Answered 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? Which of the following methods can be used if $H$ is a square matrix? 
(a) Channel inversion
(b) Singular value decomposition
(c) Non-orthogonalization
(d) None of the above

No, the answer is incorrect. None of the above.

Answered Answers: Singular value decomposition.

3) Which of the following ideas were the breakthroughs of the MIMO system? All of the above

(a) Higher capacity
(b) Diversity
(c) Orthogonality
(d) None of the above

No, the answer is incorrect. None of the above.

Answered Answers: All of the above.

4) Which of the following ideas were the breakthroughs of the MIMO system? 
(a) Channel inversion
(b) Singular value decomposition
(c) Non-orthogonalization
(d) None of the above

No, the answer is incorrect. None of the above.

Answered Answers: Both (a) and (b).

5) What is the best strategy for power allocation if all the channels have equal SNR? 
(a) Allocating all the power to the channel with the best $E_b/N_0$ and zero power to the other channels
(b) Allocating equal power to all the channels
(c) Allocating all the power to the channel with the best $E_b/N_0$ and zero power to the other channels
(d) None of the above

No, the answer is incorrect. None of the above.

Answered Answers: Allocating all the power to the channel with the best $E_b/N_0$ and zero power to the other channels.

6) Which is the relation between Capacity and Mutual Information of a channel? 
(a) Capacity is always $\leq$ MI
(b) Capacity is always $\geq$ MI
(c) They are complementary
(d) None of these

No, the answer is incorrect. None of these.

Answered Answers: They are complementary.

7) Consider a 16-QAM transceiver where all the symbols are equally likely. What is the Demoy of the source in terms of number of bits per channel use? 
(a) 0.56
(b) 0.78
(c) 0.92
(d) 1.04

No, the answer is incorrect. None of these.

Answered Answers: 1.04.

8) What is the entropy of a symbol with Gaussian distribution with mean $\mu$ and variance $\sigma^2$? 
(a) $H = \frac{1}{2} \log(2\pi e \sigma^2)$
(b) $H = \frac{1}{2} \log(2\pi e \mu^2)$
(c) $H = \frac{1}{2} \log(2\pi e \rho^2)$
(d) None of these

No, the answer is incorrect. None of these.

Answered Answers: $H = \frac{1}{2} \log(2\pi e \rho^2)$.

9) Which of the following ideas were the breakthroughs of the MIMO system? 
(a) Channel inversion
(b) Singular value decomposition
(c) Non-orthogonalization
(d) None of the above

No, the answer is incorrect. None of the above.

Answered Answers: None of the above.

10) What is the entropy of a 16-QAM transceiver where all the symbols are equally likely? 
(a) $H = \frac{1}{2} \log(2\pi e \sigma^2)$
(b) $H = \frac{1}{2} \log(2\pi e \mu^2)$
(c) $H = \frac{1}{2} \log(2\pi e \rho^2)$
(d) None of these

No, the answer is incorrect. None of these.

Answered Answers: $H = \frac{1}{2} \log(2\pi e \rho^2)$.