Unit 11 - Week 10 - Introduction to CDMA

Assignment 10

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

Due on 2019-10-09, 23:59 IST.

1) In DS-SS with length of spreading sequence Q, which of the following is true regarding the frequency response of the DS-SS pulse shaping signal? *1 point*

- Bandwidth gets scaled by Q
- Magnitude gets scaled by 1/Q
- Both a) and b)
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Bandwidth gets scaled by Q

2) What is the bandwidth of a DS-SS system with a spreading factor Q = 12 and T_s = 4μs? *1 point*

- 2.5MHz
- 5MHz
- 3MHz
- 6MHz

No, the answer is incorrect.
Score: 0
Accepted Answers:
3MHz

3) What is the symbol duration for a DS-SS system with a spreading factor Q = 10 and Chip Duration (T_c) = 40μs? *1 point*

- 4μs
- 576μs
- 200μs
- 400μs

No, the answer is incorrect.
Score: 0
Accepted Answers:
400μs

4) Which of the following is an advantage of DS-SS? *1 point*

- It improves the SNR in an AWGN environment
- It reduces the effect of Interference by introducing processing gain
- It reduces the effect of multipath
- All the above are advantages of DS-SS system

No, the answer is incorrect.
Score: 0
Accepted Answers:
It reduces the effect of Interference by introducing processing gain

5) In the lectures, two possible implementations of DS-SS matched filter based receivers were discussed. Let the two implementations be denoted by R_1 and R_2. Which of the following statements is **FALSE**? *1 point*

- R_1 is better than R_2 because it is less complex.
- R_1 is better than R_2 since the matched filter doesn't need to be changed for every symbol
- R_1 and R_2 are equivalent
- Both a) and b)

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

6) Which of the following is a primitive polynomial? *1 point*

- $1+x+x^3$
- $1+x^2+x^3$
- $1+x^3+x^4$
- All of the above

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

7) Consider m-sequences with m = 4. What will be the number of 1s and 0s respectively, in the sequences? *1 point*

- 8 and 7
- 15 and 16
- 7 and 8
- 16 and 15

No, the answer is incorrect.
Score: 0
Accepted Answers:
8 and 7

8) What will be the result of autocorrelation (as defined in the lecture) of an m-sequence with itself (i.e. with zero lag)? *1 point*

- -1
- -0.25
- 1
- 0.25

No, the answer is incorrect.
Score: 0
Accepted Answers:
1

9) Consider m-sequences with m=4. Assume that if possible, all of the 15 different sequences are assigned to 15 different users. What can be a potential problem in doing so in a multipath environment? *1 point*

- There would be no way of distinguishing between signals which are multipaths of the same user from the signals of the other users
- It is impossible to assign 15 sequences to 15 different users
- Both a) and b)
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
There would be no way of distinguishing between signals which are multipaths of the same user from the signals of the other users

10) As discussed in the lecture assume a WH sequence of length = 4 (say (4,1)) and one of its children sequences of length = 8 (say (8,3)). Would there be a problem in assigning these sequences to different users and why? *1 point*

- Yes, because the 2 sequences are orthogonal
- Yes, because the 2 sequences are not orthogonal and have perfect correlation
- No, because the 2 sequences are orthogonal
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Yes, because the 2 sequences are not orthogonal and have perfect correlation

11) Assume 2 random sequences, X and Y, each of length Q. What would be the cross correlation between these sequences when there is no lag, i.e. $R_{XY}[0]$ = ? (Hint: Refer to the lectures where the random sequences and their properties were discussed) *1 point*

- 0
- 1
- 1/Q
- Q

No, the answer is incorrect.
Score: 0
Accepted Answers:
1/Q

12) Let us look at the sinc to rect conversions. We are given a pulse $g(t) = \frac{1}{\sqrt{T}} rect\left(\frac{t-\frac{T}{2}}{T}\right)$. The Fourier Transform of g(t) , i.e., G(f) is? *1 point*

- $\sqrt{T}\, sinc(fT)e^{-\pi fT}$
- $\frac{1}{\sqrt{T}}\, sinc(fT)e^{-\pi fT}$
- $\sqrt{T}\, sinc(fT)e^{-\frac{\pi fT}{2}}$
- $\frac{1}{\sqrt{T}}\, sinc(f)e^{-\pi fT}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\sqrt{T}\, sinc(fT)e^{-\pi fT}$

13) 13) In the above question, the first zero crossing of |G(f)| i.e. the magnitude of G(f) occurs at? *1 point*

- 1/T
- 2/T
- 1/2T
- 0

No, the answer is incorrect.
Score: 0
Accepted Answers:
1/T