Unit 9 - Principles of OFDM Wireless Communication

Assignment-8

The due date for submitting this assignment has passed. **Due on 2019-10-23, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Orthogonal Frequency Division Multiplexing (OFDM) in a wireless system aims to overcome *1 point*

- Time-Varying Channel
- Inter-symbol Interference
- Multi-path propagation
- Multi-user Interference

No, the answer is incorrect.
Score: 0
Accepted Answers:
Inter-symbol Interference

2) Consider a bandwidth $B = 20$ MHz and number of subcarriers $N = 1024$ in an OFDM system. The OFDM symbol time without cyclic prefix is approximately given as *1 point*

- $51.2\ \mu s$
- $39\ ns$
- $25.6\ \mu s$
- $1.56\ \mu s$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$51.2\ \mu s$

3) Consider an OFDM frequency selective channel with channel taps $h(0), h(1), h(2), h(3), h(4)$. Let the number of subcarriers be equal to N and cyclic prefix be of length 5. With cyclic prefix, the symbol $y(2)$ corresponding to the output at time instant 2, for a noiseless scenario, is given as, *1 point*

- $h(0)x(0) + h(1)x(-1) + h(2)x(-2) + h(3)x(-3) + h(4)x(-4)$
- $h(0)x(0) + h(1)x(1) + h(2)x(2) + h(3)x(3) + h(4)x(4)$
- $h(0)x(2) + h(1)x(1) + h(2)x(0) + h(3)x(N-1) + h(4)x(N-2)$
- $h(0)x(2)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$h(0)x(2) + h(1)x(1) + h(2)x(0) + h(3)x(N-1) + h(4)x(N-2)$

4) Consider an OFDM system with channel taps $h(0) = 1 + 2j$, $h(1) = 2 - j$ in a system with $N = 4$ subcarriers. The coefficient $H(3)$ for subcarrier $k = 3$ is given as *1 point*

- $3 - j$
- $1 + 2j$
- $2 + 4j$
- $2 - 4j$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$2 + 4j$

5) Consider an OFDM system with $N = 512$ subcarriers and noise variance $\sigma^2 = 3\ dB$ at the input of the FFT. The noise variance at the output of the FFT is *1 point*

- $27.1\ dB$
- $30.1\ dB$
- $33.1\ dB$
- $32\ dB$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$30.1\ dB$

6) Consider an OFDM system with $L = 32$ IID Rayleigh fading channel taps of average power 2, $N = 512$ subcarriers, SNR = 75 dB. The BER of the OFDM system is given approximately as *1 point*

- 1.26×10^{-7}
- 1.26×10^{-8}
- 2.53×10^{-7}
- 2.53×10^{-8}

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.26×10^{-7}

7) If the number of subcarriers is $N = 1024$ and the bandwidth $B = 10$ MHz. If the cyclic prefix consists of 125 samples, what is the total OFDM symbol time without and with cyclic prefix respectively? *1 point*

- $102.4\ \mu s, 115.2\ \mu s$
- $102.4\ \mu s, 124.2\ \mu s$
- $102.4\ \mu s, 119.4\ \mu s$
- $102.4\ \mu s, 114.9\ \mu s$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$102.4\ \mu s, 114.9\ \mu s$

8) Consider an OFDM system with noise power $\sigma^2 = -3\ dB$, number of channel taps $L = 16$, number of subcarriers $N = 1024$, transmit power $P = 30$ dB. If each channel tap is IID Rayleigh with average power 3, i.e. $E\{|h(i)|^2\} = 3$, what will be the SNR at the receiver? *1 point*

- $17.19\ dB$
- $19.71\ dB$
- $16.70\ dB$
- $22.72\ dB$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$19.71\ dB$

9) Consider an OFDM system with noise power $\sigma^2 = 3\ dB$, number of channel taps L, number of subcarriers $N = 256$, transmit power $P = 50$ dB. If each channel tap is IID Rayleigh with average power 2, i.e. $E\{|h(i)|^2\} = 2$, then for BER = 5×10^{-5} in this OFDM system what can be the closest approximate about the value of L ? *1 point*

- 18
- 24
- 29
- 26

No, the answer is incorrect.
Score: 0
Accepted Answers:
26

10) OFDM is used in which of the following wireless standards *1 point*

- WCDMA
- HSDPA
- 1xEVDO
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of the above