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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2021

B.Tech VII Semester

COURSE CODE: 18B1WEC745 MAX. MARKS: 35

COURSE NAME: Next Generation Communication Systems

COURSE CREDITS: 03 MAX. TIME: 2 Hours

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q.1 Why OFDM is called multicarrier modulation scheme? Explain the working of OFDM transmitter and receiver with suitable diagram. [CO4] **[1+2+2 =5 Marks]**

Q.2 Consider a MIMO system with receiver diversity. Find out the W_{opt} and received SNR using MRC Schemes for the following channel coefficients when number of received antennas employed at receiver is two. [CO4] **[2+2 =4 Marks]**

$$h_{11} = 0.5 + 0.5j$$

$$h_{21} = 0.5 - 0.5j$$

Q.3 Write down any two standards of 3G. Explain the working of data transmission through CDMA system by considering suitable example. What are the drawbacks of CDMA technique? [CO1] **[1+2+1=4 Marks]**

Q.4 What is MIMO? How MIMO is useful in wireless communication system to improve the reliability and channel capacity? [CO4] **[1+1.5+1.5 =4 Marks]**

Q.5 Answer the following questions

a) Explain BER in wireless communication system.

b) Compute the value of SNR (in dB) required for achieving probability of BER=0.0001 in for Rayleigh fading wireless communication system.

c) Derived the expression for BER (in terms of SNR) when bit 0 was transmitted in wireless communication system. [CO2] **[1+1+2 =4 Marks]**

Q.6 Consider a multipath fading wireless channel having three multiple paths with delay of 1, 2, and 5 μsec and power profile of 0, -10, and -20 dB. Calculate the RMS and maximum delay spread of the channel. [CO3] **[3 Marks]**

Q.7 Explain Cognitivity and Reconfigurability. How it is useful in Cognitive Radio? How Cognitive Radio is useful for next generation communication system.

[CO5] **[1+1+2 =4 Marks]**

Q.8 Differentiate between

(a) Flat fading v/s Frequency selective fading

(b) 4G v/s 5G [CO1, CO3] **[2+2 =4 Marks]**

Q.9 Write short notes on the following

a) Near far effect in CDMA

b) Singular Value Decomposition

c) Multipath fading [CO1, CO4] **[1+1+1 =3 Marks]**