

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-VI Semester (ECE)

COURSE CODE (CREDITS):18B11EC611(3)

MAX. MARKS: 25

COURSE NAME: Wireless and Data Communication

COURSE INSTRUCTORS: Dr. Shweta Pandit

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1.	a) What is small-scale fading, and how does it differ from large-scale fading? Discuss the various factors that influence small-scale fading in wireless communication.	3	3
	b) What is a power delay profile, and how does it help in determining the time dispersion parameters of a multipath channel?		2
Q2.	Provide a systematic diagram illustrating the flow of information through the different layers of the OSI model. Also, explain the functions of each OSI layer in detail.	2	5
Q3.	What do you understand by outage probability under path loss and shadowing. Find the outage probability at 150m distance and 900MHz frequency for a channel based on the combined path loss and shadowing models, assuming a transmit power of 10mW and minimum power requirement -110.5dBm . Assume following shadowing parameter and path loss exponent values: $\sigma_{\text{pdB}}^2 = 13.29$, $\gamma=3.71$.	3	1-4
Q4.	How do coherence bandwidth and coherence time define small-scale fading characteristics? Explain their significance in classifying different types of small-scale fading. Discuss the various types of small-scale fading along with their conditions and causes.	3	5
Q5.	What is the cell coverage area in a cellular system? Provide the expression for calculating the cell coverage area. Consider a cellular system designed so that $P_{\text{min}} = P_r(R)$, i.e. the received power due to path loss and average shadowing at the cell boundary equals the minimum received power required for acceptable performance. Find the coverage area for path loss values $\gamma = 2, 4$ and $\sigma_{\text{pdB}} = 4, 8$. Give insight how coverage should change as γ and σ_{pdB} increases.	6	2-3