

# Wireless Communications Monsoon 2025

Exam: Quiz 1  
Total Marks: 25

Date: 01 September 2025  
Time: 3:35 pm to 04:20 pm

Instructions:

- All questions are compulsory.
- Clearly state the assumptions (if any) made that are not specified in the question.

1. Explain the WSSUS fading model of a wireless communication channel. How can this model be applied to determine the coherence time and coherence bandwidth of the wireless channel? → [12]
2. Explain shadow fading in detail. Derive the cell outage probability assuming log-normal shadowing combined with a simplified path-loss model. → [8]
3. What is ergodic capacity of the wireless channel. [5]

ALL THE BEST!

WSSUS

$$P_r = P_t K \cdot \left(\frac{d}{d_0}\right)^{-\alpha}$$

$$d_0(k) = 2\pi f_c T - 2\pi f_c d_0$$