JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

M.Tech-I Semester (ECE)

COURSE CODE(CREDITS):21M1WEC143   MAX. MARKS: 15

COURSE NAME: Fundamentals of MIMO Systems

COURSE INSTRUCTORS: Salman Talluri   MAX. TIME: 1 Hour

Note: (a)All questions are compulsory.

(b)Marks are indicated against each question in square brackets.

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

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1. What are the essential properties of probability density function (PDF) and cumulative distribution functions (CDF). Provide the relationship between these two with an example and a graph. [3 m CO-1]

2. Which type of probability density function is being used to deal with problems involving time-to-event data? Give the expression for this distribution function. What are the two steps involved in solving a problem involving density functions to find the probability of an event? [3 m CO-1]

3. Let X denote the number of mosquitoes captured in a trap during a given time period. Suppose that X has a Poisson distribution with $\lambda = 4.5$. What is the probability that the trap contains 5 mosquitoes? [3 m CO-1]

4. What are the two effects that are considered in a two-ray model for receiving a signal? How can we extend this to multi-ray model? Give equations for both these models.[3m CO-2]

5. Explain the following in brief [3 m Co-1 and Co-2]
   a. Coherence and Non-Coherence detection
   b. SNR and BER for good and bad communication systems
   c. Adjacent Channel Interference and Co-Channel Interference