

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-2 EXAMINATIONS-2024

B.Tech.- VIII Semester (All)

COURSE CODE (CREDITS): 21B1WCE831 (3)

MAX. MARKS: 25

COURSE NAME: Disaster Risk Analysis and Management

COURSE INSTRUCTOR: Dr. Sugandha Singh

MAX. TIME: 1 Hour 30 Minutes

Note: [1] All questions are compulsory. Marks are indicated against each question in square brackets.

[2] The probability tables are available with the invigilators. Request them when you need it.

1. Derive the relationship for evaluating $E(\ln X)$ denoted by λ , and $\text{Var}(\ln X)$ denoted by ξ , in terms of mean, μ_X , and standard deviation, σ_X . [CO2, CO3, 10]
2. The time between severe earthquakes at a given region follows a lognormal distribution with a coefficient of variation of 40%. The expected time between earthquakes is 80 years. [CO2, CO3]
 - a. Determine the parameters of this lognormally distributed recurrence time. [2]
 - b. Determine the probability that a severe earthquake will occur within 20 years from the previous one. [2]
 - c. Suppose the last severe earthquake in the region took place 100 years ago. What is the probability that a severe earthquake will occur over the next year? [1]
3. A new material is subjected to strength testing. Assume that the maximum load is specified at a reasonably high level so that the calculated probability of the material passing the test at the maximum load is 0.9. However, it is felt that this calculation is only 70% reliable, and there is a 25% chance that the true probability may be 0.5; moreover, there is even a 5% chance that it may be only 0.10. [CO1, CO2, CO3]
 - a. What is the expected probability of the material passing the test at maximum load? [1]
 - b. If only one specimen of material is tested, and it survives the maximum load, determine the updated distribution of the probability of the material passing the test. [3]
 - c. What is the expected probability of passing the test after the previous test? [1]
4. State the fundamental assumptions in the theory of Probability. [CO1, 5]