LNCT UNIVERSITY

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Enroll No..... **Class Roll No.....**

Second Mid Semester Examination, Dec 2024

Probability modelling and reasoning with python (AL 303)

Branch:CS/AIML Semester: III

Time 1:30 Hrs **Max. Marks 20**

Note: All questions are compulsory

Q.1 Explain how the method of moments and the maximum likelihood estimation (MLE) differ in estimating parameters of a distribution. Illustrate both methods using an example with the exponential distribution.

OR

Define Mean Squared Error (MSE) of an estimator. Given two unbiased estima tors with variances 2 and 5, which one is preferable and why?.

(CO 3 7 marks)

Q.2 Explain the meaning of a p-value. How would you interpret a p-value of 0.03 in the context of a two-tailed hypothesis test at the 5% significance level?

OR

Compare Bayesian and frequentist approaches in estimating a binomial proportion. Given 6 successes in 10 trials and a prior Beta(2,2), compute the posterior distribution of the proportion. **(CO 4 7 marks)**

Q.3. Define the following terms with respect to univariate data: Mean, Median, Mode, Variance, and Standard Deviation. When would you prefer the median over the mean?

OR

Explain the difference between the normal distribution and the t-distribution. When is the t-distribution used instead of the normal distribution in hypothesis testing?

(CO 5 6 marks)