

Computer Science & Business Systems
BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-III CS&BS : WINTER : 2024
SUBJECT: COMPUTATIONAL STATISTICS

Day : Wednesday
Date : 11/12/2024

W-29216-2024

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Assume suitable data if necessary.

Q.1 What is a class in Python? Explain the concept of a constructor and demonstrate different types of constructors (default, parameterized and non-parameterized) with examples. (10)

OR

Q.1 Write a Python program to demonstrate the concept of functions for Fibonacci series and basic calculator. Accept proper user input for the functions. (10)

Q.2 What are cross tabulations and how do they differ from pivot tables? Provide an example to explain how cross tabulations can be used in data analysis. (10)

OR

Q.2 Discuss the basics of time series data. What are the key components of a time series and how is time series data different from other types of data? Provide an example for your explanation. (10)

Q.3 Derive the formula for Multivariate Normal Distribution where variables are independent of each other. (10)

OR

Q.3 Explain in detail various assumptions of Multiple Linear Regression model such as Linearity, Collinearity, Outliers, Autocorrelation, Homoscedasticity and Normality. (10)

Q.4 Explain the curse of dimensionality. Discuss different methods such as Linear Discriminant Analysis (LDA), Principal Component Analysis (PCA) and Factor Analysis (FA) to resolve the dimensionality curse. (10)

OR

Q.4 Design the model for Multivariate Regression Model. (10)

Q.5 Design the classic equation of principal component analysis $|S - \lambda I| = 0$ (10)

OR

Q.5 What is the significance of factor rotation in Factor Analysis? Discuss a method to identify how many factors to be retained. Take suitable example. (10)

Q.6 Discuss the advantages and disadvantages of the K-means algorithm. Provide examples to illustrate both its strengths and its limitations. (10)

OR

Q.6 Describe clustering as a process model. Explain the key steps involved in applying clustering algorithms to a dataset. (10)

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