

Total No. of Questions : 8]

SEAT No. :

PE2434

[Total No. of Pages : 2

[6584]-384

**B.E. (Artificial Intelligence & Data Science)**

**DATA MODELING AND VISUALIZATION**

**(2019 Pattern) (Semester - VII) (417522)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume Suitable data if necessary.

**Q1) a)** What is Computational Statistics, and how does it relate to Data Visualization? [6]

b) How do Presentation Graphics differ from Exploratory Graphics? Provide examples. [6]

c) Discuss the role of Computing in Graphics and its impact on Data Visualization. [6]

OR

**Q2) a)** Explain the different Types of Data Visualization and their applications. [6]

b) Write a short note on Statistical Historiography in data visualization. [6]

c) What are some key Scientific Design Choices in Data Visualization, and why are they important? [6]

**Q3) a)** Explain the differences between Combining and Merging Data Sets. When should each technique be used? [6]

b) How does matplotlib compare to pandas and seaborn in terms of Data Visualization capabilities? [6]

c) Describe the key steps involved in the process of data wrangling. [5]

OR

**Q4) a)** Describe the concept of Multidimensional Scaling and its role in Data Visualization. [9]

b) What are Force-directed Techniques in Graph Layout, and how do they help in visualizing complex data structures? [8]

*P.T.O.*

- Q5) a)** Write a short note on [9]
- i) Data Aggregation
  - ii) Pivot Tables
- b)** Explain Cross Tabulation and its uses with suitable example. [9]

OR

- Q6) a)** What is the Group by mechanism in data aggregation, and how does it facilitate data analysis? [9]
- b)** What are Moving Window Functions, and how are they useful in smoothing and analyzing time series data? [9]

- Q7) a)** Discuss Data Reconstruction and its types in data modeling and visualization. [6]
- b)** Discuss a case study where medical image visualization and database modeling played a crucial role in diagnosis or treatment. [6]
- c)** Explain ultrasound images and its applications in data modeling and visualization. [5]

OR

- Q8) a)** Write a short note on [8]
- i) PET Images
  - ii) Magnetic Resonance Images
- b)** How can tools like ER/Studio, Erwin Data Modeler, and DbSchema Pro aid in structuring and analyzing medical imaging data? [9]

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