

Reg No.: \_\_\_\_\_

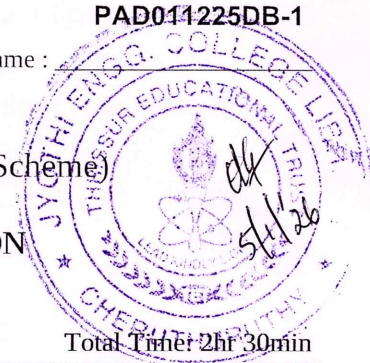
Name : \_\_\_\_\_



Jyothi Engineering College(Autonomous)

M.Tech Degree S1 (R) Examination, December 2025 (2025 Scheme)

25PADT113- DATA VISUALIZATION WITH PYTHON



Total Mark: 60

Total Time: 2hr 30min

CO MARK

**PART A**

Answer All Questions

1. Describe the role of data types and levels of measurement in choosing visualizations. CO1 (5)
2. Explain Pandas Series operations: value\_counts(), unique() and nunique(). CO3 (5)
3. Write a NumPy program that generates a  $4 \times 4$  matrix of random integers (range 1–100) and computes the row-wise mean of the matrix. Display both the generated matrix and the calculated row-wise means. CO3 (5)
4. Describe Seaborn's displot() and compare histogram vs KDE. CO4 (5)
5. Explain Dash layout and core components. CO5 (5)

**PART B**

Answer Any Five Question(s)

6. Discuss different types of multivariate visualizations and applications. CO1 (7)
7. Explain how the Pandas functions melt() and pivot\_table() differ in terms of data reshaping, and illustrate how grouping can be performed on multiple columns using an appropriate Pandas example. CO3 (7)
8. Using the following dataset, describe how missing values can be handled in Pandas and explain how to add a new column, drop an existing column, and rename columns, with suitable examples.

Student	Dept	Marks	Attendance
A	CSE	85	90
B	CSE	NaN	88
C	ECE	78	NaN
D	ECE	92	95

CO3 (7)

9. Explain how a line plot can be customized in Matplotlib, and describe how annotations, titles, and axis labels improve the readability of a chart. Also explain how to create and customize a pie chart with suitable examples. CO4 (7)

10. Using the following dataset of monthly customer footfall across three store locations, explain the concepts of Seaborn's swarmplot and boxenplot, and compare the functions relplot() and catplot() in terms of usage and output.

Month	Store	Customers
Jan	A	120
Jan	B	95
Jan	C	130
Feb	A	140
Feb	B	110
Feb	C	150
Mar	A	135
Mar	B	100
Mar	C	145

CO4 (7)

11. Create a Plotly Dash dashboard that includes a dropdown menu along with a line chart and a bar chart that update based on the selected option, and explain how the callback functions enable this interactivity.

CO5 (7)

12. Explain the concept of stateful callbacks in Plotly Dash and describe how to build a callback that uses two input values to update multiple output graphs.

CO2 (7)

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