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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 43902 Roll No. 1 2 3 0 4 3 1 1

B. Tech Examination 2025-26

Odd Semester

CONCEPTS OF DATA SCIENCE WITH PYTHON

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : $1 \times 8 = 8$

   (a) What is data science?

   (b) Why is data preparation important before model training?

   (c) What is the role of visualisation in extracting insights from data?

   (d) Write any two forms of data graphics with examples.

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(e) What is multivariate visualization?

(f) What is numpy and why is it used in python for numerical computing?

(g) List any four important features of a dataframe in pandas.

(h) Describe data set with example.

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) Explain the concept of data manipulation and visualization and discuss its significance in real-world decision-making.

(b) Compare supervised and unsupervised algorithm. Which would you choose for predicting student performance and why?

(c) Explain the different type of charts in matplotlib (scatter, pie, histogram) and mention a suitable use case for each.

(d) Describe multivariate visualization. Explain at least two techniques with example.

SECTION – C

Note:- Attempt any two parts from each question. Each part carry equal marks. $8 \times 5 = 40$

3. (a) What is the purpose of data classification? Why data classification is important?

   (b) Design a python program to create a numpy array, perform arithmetic operations, and visualize the results using matplotlib plot.

   (c) Discuss any two applications of data science in industry. Explain how data insights improve business or operational outcomes.

4. (a) Explain metrics in data visualization and how they can be integrated into dashboards for effective performance tracking.

   (b) Describe the different forms of data graphics with one example of use for each.

   (c) What is data manipulation using pandas? Explain with a simple example.

5. (a) What is descriptive statistics? Describe the type of descriptive statistics. Also differentiate with inferential statics.

(b) Discuss time-series data visualization methods. Explain how line charts or area charts help analyze trends.

(c) How can missing data be handled in a pandas dataframe? Demonstrate using dropna() and fillna ( ).

6. (a) Describe the role of interaction and animation in data visualization. Give examples of how they improve understanding.

(b) What is exploratory data analysis (EDA)? Explain its objectives and describe two technique used in EDA.

(c) Explain the stages of the data science process. Illustrate your answer with an example of a project in healthcare or retail.

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