Exam-1

* Part A

1 Write a short note: what is Data analysis?

⇒ Data analysis is the process of collecting, cleaning, transforming, and examining data to discover useful information, identify patterns, draw conclusions, and support decision-making

· understanding raw data.
· Removing errors and inconsistencies.

ex Analyzing customer purchase data to understand buying behavior, spending patterns or churn Probability.

Purpose of Data Analysis.
- To convert raw data into meaningful informa:
- To support business decisions.
- To identify trends, relationships, and anomalie

2 Describe how to plan a Data science project listing all steps.

- A Data science Project follows a structured approach to solve real-world Problems using data statistics and machine learning.

Step-1: Problem understanding.
- clearly define the business Problem.
ex Predict customer churn.

STEP-2 Data collection
- collect data from multiple source such as:
CSV files, Json files.

STEP-3 Data cleaning.
- Handle missing values.
- Remove duplicates.

STEP-4 Data exploration (EDA)
- Use statistical summaries.
- visualize data using plots.

STEP-5 feature Engineering.
- create new meaningful features.
- encode categorical variables.

STEP-6 Model Building.
- Select suitable machine learning algorithms

STEP-7 model Evaluations
- evaluate performance using metrics.

STEP-8 Deployment & monitoring
- Deploy the model.

③ Frame a machine learning Problem statement:
Predict whether a customer will churn based on
purchased behavior
- To build a machine learning classification
model that predicts whether a customer will

churn (leave) or not churn based on their purchase
behavior and demographic information.

- input Features: Age, gender, monthly Income,
Total purchases, Average monthly spend, Tensure

- target variable = churn (yes/no or 1/0).

- Type of Problem:
- Supervised Learning.
- Binary classification Problem.

4 Explain.

i) what are Tensors 9.
- A Tensor is a multi-dimensional data structure
used to store numerical data. It is a general
of scalars, vectors and matrices.

  object.

ii) Provide an in-depth explanation of tensors.
with simple examples using Numpy.
- Numpy arrays are Practical examples of tensors

• Scalar (0-0 Tensor).

  import Numpy as np.
  Scalar = np.array (10)
  point (scalar).

  • Dimension: 0
  • Represent a
  single value.

- Vector (1-D Tensor)

  vector = nP. array ([10, 20, 30])
  Print (vector)

  - Dimension : 1
  - Represents a list of values.

- matrix (2-D tensor)

  matrix = nP. array ([[1, 2, 3],
                       [4, 5, 6]])

  - Dimension : 2
  - Represents rous and columns.

- 3-D Tensor

  tensor_3d = nP. array ([
        [[1, 2], [3, 4]],
        [[5, 6], [7, 8]]
        ])
  Print (tensor_3d)

  - Dimension : 3
  - used in images, videos and deep learning model.