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Total No. of Questions : 5]

SEAT No. :

PE-5841

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M.B.A.

BA-602-MJ : PYTHON

(2024 Pattern) (Semester - III)

Time : 2½ Hours] *[Max. Marks : 50*

Instructions :

1) *All questions are compulsory.*
2) *Figures to the right indicate marks for questions/sub questions.*
3) *Answer to the questions should be specific and to the point.*
4) *Draw sketches wherever necessary with the pencils.*
5) *Graph paper will not be provided.*

Q1) Solve any five : **[5 × 2 = 10]**

a) Define variables and literals with one example each.

b) What is type casting? Give one example

c) Differentiate between local and global scope.

d) Illustrate with examples how exception handling is implemented in Python.

e) Explain the use of the timedelta and datetime objects in Python.

f) Name any two IDEs commonly used for Python.

g) Illustrate any two techniques used to retrieve help information in Python.

h) What are Python keywords? List any four of them

Q2) Solve any Two : **[2 × 5 = 10]**

a) A retail company wants to collect basic information from customers who participate in a feedback program. As a Python developer, you are asked to design the structure of a dataset that stores the following fields:

- Customer Name
- Age
- Purchase Amount
- Membership Status
- List of Items Purchased

Explain the most suitable Python data type for each of the above fields and justify your choices based on. the nature of the data.

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b) A bank wants to automate the calculation, of compound interest for its customers. Write a user-defined Python function that accepts the principal amount, rate of interest, and number of years, and calculates the compound interest. Demonstrate calling this function by accepting the required inputs from the user.

c) Justify the statement that Python is one of the most preferred programming languages by explaining the key features that contribute to its popularity.

Q3) Solve any one : **[1 × 10 = 10]**

a) Describe the various data structures supported by Python. Discuss any two data structures in detail, highlighting their features and applications.

b) A Retail Operations Analyst is managing a product inventory dataset stored in a CSV file located at "D :/RetailSystem/Inventory/product inventory,csv", The file contains the following fields: Product_ID, Product Name, Category, Stock_Quantity, Unit_Price, Last_Updated. Using Python, perform the tasks below:

i) Import the dataset from the given path into a Pandas DataFrame.

ii) Examine the structure of the DataFrame by showing column names and their data types.

iii) Display the first five and last five records to understand the dataset layout.

iv) Append the following new product items to the DataFrame:

Product_ID	Product_Name	Category	Stock_Quantity	Unit_Price	Last_Updated
P701	Smart Kettle	Appliances	120	2600	2025-09-10
P702	Wireless Router	Electronics	75	3400	2025-09-12
P703	Yoga Mat Deluxe	Fitness Gear	200	850	2025-09-14

v) Export the updated inventory data to the same directory with a new filename:

product_inventory_updated. csv

vi) Move the updated file to a backup directory located at:

D:/RetailSystem/Backup/

vii) Remove the original CSV file after verifying that the updated file exists and has been successfully created.

Write Python code demonstrating each file-handling step and explain the purpose of each operation.

Q4) Solve any one : **[1 × 10 = 10]**

a) Describe the complete data analysis workflow using Python.

b) Write a Python program that accepts ten numbers from the user using a loop. Use conditional statements to count how many of the entered numbers are even and how many are odd and display the final counts.

Q5) Solve any one : **[1 × 10 = 10]**

a) SmartHome Electronics Pvt. Ltd. manufactures and sells four major product lines: Air Purifiers, Smart Lights, Kitchen Robots, and Security Cameras. The company tracks monthly demand to plan production, inventory, and marketing strategies. The demand data (in units sold) for six recent months is shown below :

Month	Air Purifiers	Smart Lights	Kitchen Robots	Security Cameras
Jan	850	1450	600	900
Feb	920	1580	650	950
Mar	980	1620	700	1000
Apr	1100	1700	780	1080
May	1250	1850	820	1150
Jun	1300	1900	900	1200

The management wants a data-driven visual report to understand category performance and seasonality. As a Data Analyst at SmartHome Electronics, analyze the monthly demand data and prepare insights for management.

i) Using NumPy, perform the following:

- Store each product category's monthly demand in separate arrays.
- Compute the average demand for each product category.
- Calculate the total demand per month across all product categories.
- Identify the highest and lowest demand values in the entire dataset.

ii) Using Matplotlib, create:

- A line chart showing monthly demand trends for all four product categories.
- A bar chart comparing the average demand across categories.
- A pie chart illustrating each product category's share in total six- month demand.

iii) Write a summary on:

- How NumPy accelerates numerical analysis
- How Matplotlib assists managerial decision-making through trend analysis, forecasting, product planning, and inventory optimization.

b) As a data analyst in a leading organisation, explain how Python can be applied across various busines domains such as marketing analytics, financial modelling, HR analytics, and operational performance improvement.

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