PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fourth Semester)

Branch - **MATHEMATICS WITH COMPUTER APPLICATION**

DATA ANALYTICS WITH PYTHON

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Choose the correct keyword to define a variable in Python. a) var b) let c) define d) No specific keyword	K1	CO1
	2	Summarize the function of the dir() method in Python. a) It lists all files in a directory b) It displays methods and attributes of an object c) It is used to remove files d) It checks the existence of a file	K2	CO2
2	3	Define an exception in programming. a) A syntax error in code b) A runtime error that disrupts program flow c) A user-defined function d) A variable name	K1	CO1
	4	Outline the correct way to declare a user-defined function in Python. a) define function_name(): b) function function_name(): c) def function_name(): d) void function_name():	K2	CO2
3	5	Relate the correct syntax for defining a dictionary. a) { "name": "John", "age": 25 } b) ["name": "John", "age": 25] c) ("name": "John", "age": 25) d) dict["name" = "John", "age" = 25]	K1	CO1
	6	Identify the key characteristic of tuples that differentiates them from lists. a) They allow duplicate values b) They are immutable c) They can only store numbers d) They require unique elements	K2	CO2
4	7	Find the correct function to create a one-dimensional NumPy array. a) np.array() b) np.array[] c) np.array{} d) np.array<>	K1	CO1
	8	Key difference between apply() and map() in Pandas: a) apply() works on data_frames, map() on series b) apply() works on columns/rows, map() on elements c) apply() works on data, map() on databases d) apply() works on method, map() on function	K2	CO2
5	9	Which function in Matplotlib is used to create a histogram? a) histogram() b) hist() c) scatter() d) history()	K1	CO1
	10	Show the key feature of a Quiver Plot. a) It represents directional data with arrows b) It is used for financial analysis c) It only supports 2D plotting d) It displays stacked bar charts	K2	CO2

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Solve a problem using Python where a user enters a sentence, and the program counts the number of vowels and consonants in.	K3	CO3
		(OR)		
	11.b.	Develop a Python function that takes a list of numbers as input and returns the sum of only the even numbers		
2	12.a.	Apply nested loops to generate a multiplication table for numbers from 1 to 10.	K3	CO3
		(OR)		
	12.b.	Develop a Python program to check whether a given number is prime using functions.		
3	13.a.	Inspect the memory management differences between lists and tuples in Python.	K4	CO4
		(OR)		
	13.b.	Analyze how combining dictionaries and lists can enhance efficiency in Python programs.		
4	14.a.	Compare the efficiency of NumPy arrays vs. Pandas DataFrames for large datasets.	K4	CO4
		(OR)		
	14.b.	Contrast loc[] and iloc[] indexing in Pandas with examples to highlight their key differences.		
5	15.a.	Explain the impact of SQLAlchemy in handling large-scale databases efficiently.	K5	CO5
		(OR)		
	15.b.	Recommend the best chart type for analyzing categorical data distribution.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Examine the role of Python's input and output functions and how they handle different data types.	K4	CO4
2	17	Compare object-oriented programming with procedural programming, highlighting their strengths and weaknesses.	K4	CO5
3	18	Measure how Python's dictionary data structure enhances data retrieval performance compared to lists.	K5	CO5
4	19	Assess the role of Pandas in modern data science applications and determine its impact on data preprocessing.	K5	CO5
5	20	Construct a custom Matplotlib plot combining multiple chart types for complex data.	K6	CO6

Z-Z-Z END