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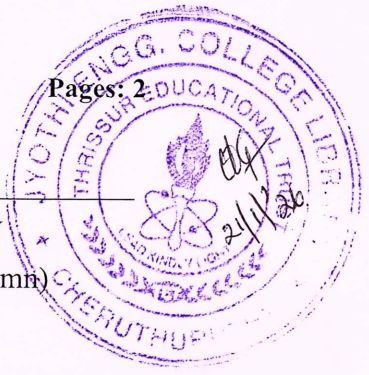

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (Minor) Examination November 2025 (2024 Admn)

Course Code: MNCST319

Course Name: PYTHON FOR ARTIFICIAL INTELLIGENCE

Max. Marks: 60 Duration: 2hours 30minutes

PART A

(Answer all questions. Each question carries 3 marks)

		CO	Marks
1	Write a python program using while loop to find the sum of all odd numbers between 1 and 50	CO1	(3)
2	State the key difference between a mutable and an immutable data type in Python, giving one example of each.	CO1	(3)
3	Define the concept of Encapsulation in Object-Oriented Programming	CO2	(3)
4	What are Instance Variables in a Python class? Give a short example of defining one in a constructor.	CO2	(3)
5	Write NumPy code to create an array of 5 zeros and an array of 5 ones.	CO3	(3)
6	Explain the purpose of the xlabel(), ylabel(), and title() functions when using Matplotlib for plotting a graph.	CO3	(3)
7	Explain the difference between a Pandas Series and a DataFrame. Provide one practical use-case for each in data processing.	CO4	(3)
8	How to create a DataFrame from a dictionary and extract specific columns or rows? Explain with an example.	CO4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

			CO	Marks
9	a)	Explain the purpose of the range() function and demonstrate its use in a for loop to print all multiples of 5 between 1 and 50	CO1	4
	b)	Write a python program that accepts a list of integers and prints the largest and smallest number in the list without using built-in functions max() or min()	CO1	5
10	a)	Write python code to create a dictionary representing a student's profile (e.g., keys: 'Name', 'Age', 'RollNo') and demonstrate how to add a new key-value pair ('City') and change the existing 'Age'.	CO1	4
	b)	Write a python function to check if a given input string is a palindrome.	CO1	5

Module -2

11	a)	Define and explain the concept of Inheritance in python OOP. Provide a simple example showing a base class and a derived class.	CO2	4
	b)	Create a class named Rectangle with two instance variables, length and width. Implement a constructor (__init__) and a method named get_area() to return the area.	CO2	5
12	a)	Create a python class named Student with the following: a constructor to initialize name and roll_number, and a method display_info() to print both details.	CO2	4
	b)	Write a python program to define a custom exception class named InvalidInputError. Implement a simple function that raises this exception if the input is zero.	CO2	5

Module -3

13	a)	Write python code using NumPy to perform the following matrix operations on two 2×2 matrices A and B of your choice: i) Matrix addition (A+B) ii) Element-wise multiplication (A*B)	CO3	4
	b)	Write a Python program using Matplotlib to plot a simple line graph of the equation for y = 2x + 1, values ranging from 0 to 5.	CO3	5
14		Write a Python program using **NumPy** to solve the following system of linear equations represented by the coefficient matrix A and constant vector b.		
	a)	$$\begin{aligned} x_1 - 2x_2 + 9x_3 + 13x_4 &= 1 \\ -5x_1 + x_2 + 6x_3 - 7x_4 &= -3 \\ 4x_1 + 8x_2 - 4x_3 - 2x_4 &= -2 \\ 8x_1 + 5x_2 - 7x_3 + x_4 &= 5 \end{aligned}$$	CO3	4
	b)	Describe the different types of plots available in Matplotlib and show how it is implemented using python	CO3	5

Module -4

15	a)	Write python code using Pandas to: i) Read a CSV file named students.csv. ii) Print the list of all column names. iii) Print the sum of marks of students in the marks column.	CO4	4
	b)	Describe the step-by-step process of data splitting (train-test split) using the scikit-learn library, explaining the purpose of the split.	CO4	5
16	a)	Write python code using Pandas to create a DataFrame from the following data: Names: ['A', 'B', 'C'], Scores: [85, 75, 95]. Write code to filter the DataFrame to select and display only the rows where the Score is greater than 80.	CO4	4
	b)	Explain the three key steps in constructing and using a Simple Linear Regression model, starting from model fitting to prediction.	CO4	5

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