D1ACA2504 **(2 Pages)** **Name.....**
Reg. No.....

FIRST SEMESTER M.C.A. DEGREE EXAMINATION, NOVEMBER 2025

M.C.A.
MCA25104 - PYTHON PROGRAMMING

Time: 3 Hours **Maximum Marks: 100**

Answer any *five* questions. Each carry *twenty* marks.

1. a) What is the difference between a mutable data type and an immutable data type? Give examples for each.

   b) Convert the following Python code to equivalent while loop.

   ```
   for count in range(50, 100, 2):
       print(count)
   ```

   c) Illustrate the use of any three dictionary methods with examples.

   d) Predict the output of the following python code? Justify your answer.

   ```
   List1 = [10, 20, [1, 2, 3], 'hello', 40, [4, 5, 6]]
   X = len(List1)
   print(x)
   ```

2. a) Compare class and object. Generate a class to represent a Vehicle object with attributes owner_name, registration_number, model_name and methods display_details().

   b) Define Inheritance in python. Explain single inheritance and multiple inheritance with programming examples.

   c) What are exceptions? How does Python catch it? Illustrate the usage.

3. a) Define NumPy. Explain the use of pandas library in python with programming examples.

   b) Write a python program to create two numpy arrays of random integers between 1 and 10 of shape (3, 3) and perform the following operations.

   i) Element-wise addition of two NumPy arrays.

   ii) Multiply each element of first NumPy array by a scalar value.

   iii) Calculate the mean of first NumPy array.

   c) Consider a CSV file 'students.csv' with columns such as 'rollno', 'name', 'gender', 'email', and 'total_mark'. Write commands to do the following using panda library.

   i) Display the first 5 records.

   ii) Print all student names in ascending alphabetical order.

   iii) Print the name of the student with the highest total mark.

(P.T.O.)

4. a) What are the key parameters of the bar plot function in Matplotlib? Explain with an example.

   b) How to plot two or more lines on a same plot with suitable legends, labels and a title? Demonstrate with an example program.

   c) Explain the steps involved in creating a Django model and connecting it to a database.

5. a) With the help of an example, explain how we can fetch data from a SQL database in Python.

   b) Write a program to connect Python with MySQL using database connectivity and display details of student who has scored marks greater than 75 from Student2025 database table.

   c) Describe the role of cursor and connection objects in Python database connectivity. Write an example demonstrating how they are used to execute SQL statements.

6. a) List out any three set operations supported by python with examples.

   b) Create an Abstract Base Class called Vehicle that include abstract methods moveForward() and turnRight(). Then derive two classes Truck and Car from the Vehicle class and implement the moveForward() and turnRight() methods. Write a Python program to implement above concept.

   c) Write a program to connect Python with MySQL using database connectivity and insert the details of a particular student (rollno, name, age, mark) into the Student2025 database table.

7. a) Explain how the matrix multiplications are done using numpy arrays.

   b) What is the role of models.py file in a Django application? Illustrate with an example program.

   c) Write a Python program using a database adapter to retrieve and display all rows from a table named employees. Also explain how exceptions can be handled during database operations.

(5 × 20 = 100 Marks)