

2025

**M.Sc. 1st Semester Examination**  
**APPLIED MATHEMATICS**



**Paper : MTME405A0/B0**

Full Marks : 50

Time : Two Hours

*The figures in the margin indicate full marks.  
Candidates are required to give their answers  
in their own words as far as practicable.*

**(Elective-I)**

**Paper : MTME405A0**

**[Programming in Python]**

**Group - A**

Answer any *four* questions :  $2 \times 4 = 8$

1. What is an exception? Explain with few examples. [CO3]
2. How to create user defined exception in Python with an example. [CO3]
3. What is the output of `print (tpl[1:3])` if `tpl = ('abcd', 786, 2.23, 'john', 70.2)`? [CO3]

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4. What are the rules for writing an identifier? [CO1]
5. What is tuple? What is the difference between list and tuple? [CO3]
6. Explain about string slicing with examples. [CO3]

**Group - B**

Answer any *four* questions : 4×4=16

7. What is inheritance? Illustrate types of inheritance with Python code. [CO4]
8. Write a class with following criteria : [CO4]  
  
Class name: Flower  
  
Objects: lily, rose, hibiscus  
  
Properties: price, color, smell  
  
Methods: get(), display()
9. Write a small code to illustrate try and except statements in Python. [CO4]
10. Write a Python program to convert temperature Celsius to Fahrenheit. [CO2]
11. How a string is declared in Python? How to split strings and what function is used to perform that operation? 2+2 [CO3]
12. Describe the syntax and semantics of any two loop structures provided by Python. 2+2 [CO2]



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**Group - C**

Answer any *two* questions : 8×2=16

13. What is the concept of a class in Python? Write a class in Python defining a constructor, a method for finding *n!* and a method for displaying the value of *n!*. 2+6 [CO4]
14. What are the basic list operations that can be performed in Python? Explain three operations with its syntax and example. 2+2+2+2 [CO3]
15. Explain briefly constant, variables, expression and keywords available in Python. 2+2+2+2 [CO1]
16. (i) Explain the features of a dictionary.  
(ii) What are the three types of import statement in Python? Explain.  
(iii) Write a short note on assert function. 3+3+2 [CO3]

**Internal Assessment : 10 marks**



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(Elective-II)

Paper : MTME405B0

[Programming in C++]

Group - A

Answer any *four* questions : 2×4=8

1. What are the basic data types in C++? [CO1]
2. What are the differences between ++x and x++, where x is an integer variable? [CO1]
3. Write four features of an object oriented programming language. [CO3]
4. What are the differences between class and object? [CO3]
5. How a pointer variable is defined, initialised, and accessed? [CO2]
6. What do you mean by a constructor and a destructor? [CO3]

Group - B

Answer any *four* questions : 4×4=16

7. Write a short note on inline function in C++? [CO1]
8. Define a class to store a complex number having public functions for addition, multiplication, and division of two objects. Also write a public function to display the object. [CO3]

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9. Write program to read *n* numbers from a file, stores the same in an array, and print a sorted list in the same file. The array size should be allocated dynamically based on the input value of *n* from keyboard. [CO2]
10. Explain inheritance using an example. [CO3]
11. Give a brief descriptions on the different modes in handling files in C++. [CO4]
12. Write a program to read a sentence from the keyboard and count the number of characters in it. [CO2]

Group - C

Answer any *two* questions : 8×2=16

13. Write a program to define a class named matrix to store a two dimensional array and its size. Overload operator \* for the multiplication of two objects. Use it to read two matrices from a file and find their product if exists. [CO3]
14. Write a program to define a class that can store a real vector and its size. Define a public function **sum** to sum the elements of the vector. Overload the same function to add two vectors. Define another public function to display the vector. [CO3]
15. How a two dimensional array can be defined dynamically? Use it to read *n* names from a file, sort

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the same, and store the sorted list in another file, where  $n$  is an input from keyboard. [CO4]

16. Write short notes on polymorphism and virtual functions. [CO3]

**Internal Assessment : 10 marks**

