

Reg No :

Name :

**MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM**

(Govt. Aided Autonomous Institution)

Second Semester B.Tech. Degree Examination, May, 2026

Course Code: B24CS1T02

Course Name: INDUSTRIAL PROGRAMMING

Max. Marks: 100

Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)**Answer all questions**

1. Write a Python program to count number of even numbers and odd numbers in a given set of n numbers.
2. What is the purpose of the **else** clause in loops in Python? Write an example program to demonstrate it.
3. Write a Python program to extract and print the middle character of a string.
4. Illustrate the use of any four List methods.
5. List any three image processing Python libraries.
6. What are the attributes of a turtle object?
7. Describe the significance of the self keyword in Python classes.
8. Explain the concept of exception handling and its importance.
9. Write a program to filter out rows in a data frame where the column value is greater than 100.
10. Write a Python code to generate a 3x3 matrix of random numbers using NumPy. Provide an example.

PART - B: 70 Marks (5 Qns x 14 Marks)**Answer any One full question from each module.****Module 1**

11. a. Given the value of x, write a Python program to evaluate the following series upto n terms:

(7 Marks)

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots$$

- b. The program below results in an error due to variable scope. Explain the issue and correct the code:

(7 Marks)

```
def update_value():  
    value += 5  
    print(value)  
value = 10  
update_value()
```

OR

12.

- a. Write a Python program that takes a string, converts it to uppercase, and reverses it. (7 Marks)
- b. Describe Arithmetic Operators, Comparison Operators, Logical Operators and Bitwise operators in detail with examples. (7 Marks)

Module 2

13.

- a. Write a program that removes all duplicate values from a dictionary while keeping keys unique. (7 Marks)
- b. Write a Python program to count how many times each character appears in a given string and store the count in a dictionary with key as the character. (7 Marks)

OR

14.

- a. Write a Python program to implement a dynamic array that supports insertion, deletion, and resizing. (7 Marks)
- b. Describe the concept of recursive function in Python with suitable example. (7 Marks)

Module 3

15.

- a. Write a Python program to apply a blur effect to an image. (7 Marks)
- b. Write a Python function that converts an image to grayscale. (7 Marks)

OR

16.

- a. Write a Python program using Turtle to draw a house with a door and windows. (7 Marks)
- b. Write a python program to draw a parallelogram using turtle and fill with a colour. (7 Marks)

Module 4

17.

- Design a BankAccount class with private attributes: account_number, balance, and account_holder. Implement methods to: Deposit money into the account. Withdraw money, ensuring sufficient

balance. Display account details while keeping the account number private. Create an instance, perform transactions, and demonstrate how encapsulation prevents direct access to balance.

(14 Marks)

OR

18. Write a Python program to demonstrate method overriding by creating a Shape class with an area() method and a Rectangle subclass that overrides it to calculate area. Instantiate both classes and illustrate its working. (14 Marks)

Module 5

19. a. Explain how subplots can be created using Matplotlib and provide an example of a 2x2 grid of plots. (7 Marks)
- b. Develop a Python program that plots a sine wave and customizes the x-axis ticks to display multiples of π . (7 Marks)

OR

20. a. Develop a NumPy program to generate a matrix of random numbers between 0 and 1. (7 Marks)
- (i) Replacing all values greater than 0.5 with 1 and the rest with 0.
 - (ii) Find the percentage of ones in the matrix.
 - (iii) Compute the rows and column-wise sums.
- b. Create a NumPy array of 100 random integers between 1 and 500. Compute and display the mean, median, standard deviation, minimum, and maximum values. (7 Marks)
