

2024
SRMUJ
M. Sc.
1st Semester Examination
Mathematics
MTM-106

Full Marks: 40**Time: 2 Hours**

The figures in the margin indicate full marks. Candidates are required to give their answers as far as practicable. **Use separate sheets for each unit.** Notations used here have their usual meaning.

Unit-I [Advanced Programming in C++]

1. Answer any two of the following questions: **2 × 2**

- (a) What are differences between the array and pointer variables?
- (b) What is the difference between Structure and Union in C++?
- (c) How to make an outside function “friendly” to a class in C++?
- (d) Write any two memory functions with syntax in C++.

2. Answer any two of the following questions: **8 × 2**

- (a) What are the limitations of structures in C++? Explain with an example that a structure may be the argument of a function in C++. 3 + 5
- (b) What is inheritance in C++? What is the difference between multiple inheritance and multilevel inheritance? Write some limitations of inheritance. 2+2+4
- (c) Define object in C++. How to define a member function outside a class definition? Write a program in C++ to find the mean of two numbers using friend function. 2+2+4
- (d) What is constructor function in C++? Write some special characteristics of constructor function. What are the limitations of constructors? Write some difference of constructor and destructor. 2+2+2+2

Unit-II [MATLAB]

3. Answer any two of the following questions: **2 × 2**

- (a) What types of tasks is MATLAB best suited for?
- (b) Describe how to perform element-wise operations on arrays in MATLAB and give an example.
- (c) What is the purpose of the hold on and hold off commands in MATLAB?

(d) Write a MATLAB program to count the number of positive numbers in a list without using loop.

4. Answer any two of the following questions: **8 × 2**

(a) (i) Write down the advantages and disadvantages of using MATLAB.

(ii) How can you create a matrix of random integers between 1 and 100 of size 4×4 ? Explain the approach.

(iii) What is the difference between = and == in MATLAB? $4 + 2 + 2$

(b) (i) Explain the difference between a script and a function in MATLAB. Provide an example of each. 4

(ii) Write a MATLAB script to determine whether a given year is a leap-year or not. 4

(c) Write the name of different MATLAB windows. Explain the purpose of these MATLAB windows. $2 + 6$

(d) (i) Explain the relational and logical operations in MATLAB with examples.

(ii) Consider the array

$$c = \begin{bmatrix} 1.1 & -3.2 & 3.4 & 0.6 \\ 0.6 & 1.1 & -0.6 & 3.1 \\ 1.3 & 0.6 & 5.5 & 0.0 \end{bmatrix}$$

Find out the flowing results:

What is the size of c ? What is the value of $c(2,3)$? List the subscripts of all elements containing the value 0.6. What is the result of $\text{numel}(c)$? $4 + 4$