

M.Sc. Semester-I Examination, 2018**Subject: Mathematics****Paper: MTM-106; Unit: 2****(Computational Methods: Using MATLAB)****Full Marks: 25****Time: 2 Hours****1. Answer any one question from each group on lottery basis.****(20)****Group A****(1 × 6 = 6)**

- i. Test whether a number is Palindrome or not.
- ii. Find the prime factors of a given number.
- iii. Calculate ${}^n C_r$.
- iv. Write program in MATLAB to generate Fibonacci series.
- v. Find the roots of the equation
 $X^2+5x+6 = 0$
- vi. Find the trace of a square matrix.
- vii. Test a number whether it is divisible by another number or not.
- viii. Write a program to find whether a number is prime or not and using this generate all the prime numbers between two specified numbers.

Group B**(1 × 6 = 6)**

- i. Generate a Pie chart of 35, 42, 25, 36, 29, 16.
- ii. Write a script in MATLAB to find the histogram of following set of data
 $\{x_i, y_i, z_i : i = 1, 2, 3, \dots, n\}$
- iii. Write a script in MATLAB to draw the surface of the equation
 $z = x e^{-x^2-y^2}$ in the range $-3 \leq x \leq 3$ and $-3 \leq y \leq 3$
- iv. Write a script in MATLAB to draw the following function in the interval $\{-1, 4\}$
$$f(x) = \begin{cases} x^2 + 1 & -1 \leq x < 0 \\ 0 & x = 0 \\ x^3 + 2x + 5 & x > 0 \end{cases}$$
- v. Write a script in MATLAB to draw $y = |x|$ in the interval $[-4, 4]$. Mention title, axes and axes limits.
- vi. Write a script in MATLAB to draw $\sin(x)$ and $\cos(x)$ in the interval $[0, 4\pi]$ in the same figure with different line specification.
- vii. Write a script in MATLAB to draw the Pie diagram of a M.Sc. 1st Semester student of the following marks 35, 42, 45, 36, 38, 15

Group C**(1 × 8 = 8)**

- i. Write a script in MATLAB to find the real root of the equation $x^3 + x - 5 = 0$ by Bisection method.
- ii. Write a script in MATLAB to find the value of $\int_0^1 x^2 dx$ by dividing 100 sub intervals using Simpson's 1/3rd method.
- iii. Write a script in MATLAB to find the mean of the following numbers 7, 9, 8, 6, 3, 9, 8, 5, 7, 11.
- iv. Write a script in MATLAB to find the deviation of the following numbers 7, 8, 9, 10, 11, 12, 13, 15, 17.
- v. Write a user defined function in MATLAB to find the value of $\int_a^b f(x) dx$ using Trapezoidal rule. Using this, find the value of Integral $\int_0^1 x dx$ by dividing 100 sub intervals.

2. Laboratory Note Book and Viva-voce.**5**