

2017

M.Sc.

1st Semester Examination

**APPLIED MATHEMATICS WITH OCEANOLOGY
AND
COMPUTER PROGRAMMING**

PAPER—MTM-106 (Unit-2)

Subject Code—21

(Practical)

Full Marks : 25

Time : 2 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Lab1 : (Computational Methods : Using MATLAB)

Answer any one question from each group on lottery basis.

Group A

Select one question on lottery basis.

1×6

1. Write a script in MATLAB to generate the prime number between two specified numbers.

(Turn Over)

2. Write a script in MATLAB to find the sum of all prime numbers between two specified numbers.
3. Write a script in MATLAB to test a number is Armstrong number or not.
4. Write a script in MATLAB to find the product of diagonal elements of a square matrix.
5. Write a script in MATLAB to find the product and right division of two compatible matrices.
6. Write a script in MATLAB to test a number is palindrome or not.
7. Write a script in MATLAB to generate Pascal triangle.
8. Write a script in MATLAB to calculate the ${}^n C_r$.
9. Write a script in MATLAB to calculate the roots of the cubic equation $x^3 + 1 = 0$.
10. Write a user defined function in MATLAB to test a number is prime or not prime.

11. Write a user defined function in MATLAB to test a number is divisible by another number or not and using this conclude for the numbers 9999 and 11.
12. Write a script in MATLAB to find the average between 70 to 99.
13. Write a script in MATLAB to find the Inverse of a matrix.

Group B

Select *one* question on lottery basis.

1×8

1. Write a script in MATLAB to find the real root of the equation $f(x) = 0$ by Newton-Raphson method and using this find a real root of the equation $\cos x - 3x + 1 = 0$.
2. Write a script in MATLAB to find the real root of the equation $f(x) = 0$ by bisection method and using this find a real root of the equation $\cos x - 3x + 1 = 0$.
3. Write a script in MATLAB to calculate correlation coefficient of bivariate samples numbers and using this find the correlation coefficient of the following data : $X = \{1, 2, 3, 4, 5, 6, 7\}$ and $Y = \{9, 8, 10, 12, 11, 13, 14\}$.

4. Write a script in MATLAB to find the value of $\int_a^b f(x)dx$ by

Trapezoidal rule and using this find the value of the integral

$$\int_0^1 \frac{1}{1+x} dx \text{ by dividing 1000 sub-intervals.}$$

5. Write a script in MATLAB to find the value of $\int_a^b f(x)dx$ by

Simpson 1/3's rule and using this find the value of the

$$\text{integral } \int_0^1 \frac{1}{1+x^2} dx \text{ by dividing 1000 sub-intervals.}$$

6. Write a script in MATLAB to this find the median of the following numbers : 7, 8, 9, 6, 3, 9, 8, 5, 7, 11.
7. Write a script in MATLAB to calculate standard deviation of the following numbers : 7, 8, 9, 6, 3, 9, 8, 5, 7, 11.
8. Write a script in MATLAB to calculate standard deviation of a set of numbers and using this find the standard deviation of the following numbers : 7, 8, 9, 6, 3, 9, 8, 5, 7, 11.

9. Write a script in MATLAB to find the mean and standard deviation for discrete distribution. Test using following data :

x_i	1	2	3	4	5	6	7	8	9
f_i	8	10	11	16	2	5	17	13	4

10. Write a script in MATLAB to find the median and mode for discrete distribution. Test using following data :

x_i	1	2	3	4	5	6	7	8	9
f_i	8	10	11	16	2	5	17	13	4

11. Write a script in MATLAB to find the mean, mode and median of 15, 16, 17, 20, 16, 13, 20, 17, 16.
12. Write a script in MATLAB to find standard deviation of the following data 16, 20, 30, 17, 20, 19, 18.

Group C

Select *one* question on lottery basis.

1×6

1. Draw a Pie diagram of the No. of people in a village

Man	—	250
Women	—	259
Child	—	100

- Write a script in MATLAB to draw $\sin t$ and $\cos t$ in the interval $[-\pi, \pi]$ in the same figure with different line specification.
- Write a script in MATLAB to draw $\sin t$ and $\sin 4t$ in the interval $[0, 4\pi]$ with mentions title, axes and different line specification.
- Write a script in MATLAB to draw following parametric equations $x = \sin t$ and $y = \cos t$ in the interval $[0, 2\pi]$.
- Write a script in MATLAB to draw $y = |x|$ in the interval $[-4, 4]$ with mentions title, axes and axes limits.
- Write a script in MATLAB to draw the following function in the interval $[-1, 4]$

$$f(x) = \begin{cases} x^2 + 1, & -1 \leq x < 0 \\ 0, & x = 0 \\ x^3 + 2x + 5, & x > 0 \end{cases}$$

7. Write a script in MATLAB to draw the following function in the interval $[-\pi, \pi]$

$$f(x) = \begin{cases} \sin x, & -\pi \leq x < 0 \\ 0, & x = 0 \\ \tan x, & x > 0 \end{cases}$$

8. Write a script in MATLAB to draw the surface of the equation $z = x^2 + y^2$ in the range $-3 \leq x \leq 3$ and $-3 \leq y \leq 3$.
9. Write a script in MATLAB to draw the surface of the equation $z = xe^{-x^2-y^2}$ in the range $-3 \leq x \leq 3$ and $-3 \leq y \leq 3$.
10. Write a script in MATLAB to draw the contour of the equation $z = \sin x + \cos y$ in the range $-2\pi \leq x \leq 2\pi$ and $0 \leq y \leq 4\pi$.
11. Draw a bar chart in MATLAB for the following data :

X	20	30	35	40	50
Y	40	60	70	65	45

12. Draw a histogram in MATLAB for the following data :

X	1	2	3	4	5
Y	40	30	20	90	100

Note book and Viva : 05 Marks.
