2016

M.Sc. 1st Semester Examination

APPLIED MATHEMATICS WITH OCEANOLOGY
AND
COMPUTER PROGRAMMING

PAPER—MTM-106 (Unit-2)

(Practical)

Full Marks : 25

Time : 1 Hour

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.   6×1

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

2. Write a script in MATLAB to test a number is divisible by another number or not.

3. Write a script in MATLAB to find the product of two compatible matrices.

4. Write a script in MATLAB to generate Pascal triangle.

5. Write a script in MATLAB to find the prime factors of some given number.

6. Write a script in MATLAB to calculate the ^nC_r.

7. Write a script in MATLAB to test a number is prime or not prime.

8. Write a user defined function in MATLAB to find the trace of a matrix and using this find the trace of a square matrix.

9. Write a user defined function in MATLAB to test a number is palindrome or not and using this conclude 1234321 is a palindrome number.

10. Write a user defined function in MATLAB to calculate the roots of a quadratic equation using this find the roots of the equation $x^2 + 5x + 6 = 0$

(Continued)

11. Write a user defined function in MATLAB to test a number is prime or not and using this generates all prime numbers between two specified numbers.

12. Write a user defined function in MATLAB to calculate sum of a set of numbers and using this find the sum of all natural numbers between two specified numbers.

13. 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.

14. Write a program in MATLAB to generate Fibonacci number.

15. Calculate ^nC_r.

16. Find prime number between 100 to 200.

17. Find prime factors of given numbers.

18. Test a number is Palindrome or not.

19. Generate pascal triangle.

20. Find seen of all natural number between 7 to 70.

21. Find the roots of the equation $x^2 + 5x + 6 = 0$.

(Turn Over)

22. Test a number is divisible by another number or not.

23. Find the trace of a square matrix.

Group B

Select *one* question on lottery basis.   6×1

1. Write a script in MATLAB to find the pie diagram of a M.Sc. 1st semester student of the following marks : 35, 42, 25, 36, 38, 15.

2. Write a script in MATLAB to draw sin t and cos t in the interval $[0, 4\pi]$ in the same figure with different line specification.

3. Write a script in MATLAB to draw sin t in the interval $[0, 4\pi]$ with mentions title, axes and different line specification.

4. Write a script in MATLAB to draw following parametric equations x = sin t and y = cos t in the interval $[0, 2\pi]$.

5. Write a script in MATLAB to draw y = |x| in the interval $[-4, 4]$ with mentions title, axes and axes limits.

6. Write a script in MATLAB to draw the following function in the interval $[-1, 4]$

      (Continued)

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

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

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

8. Write a script in MATLAB to draw the surface o the equation $z = x^2 + y^2$ in the range $-3 \le x \le 3$ and $-3 \le y \le 3$.

9. Write a script in MATLAB to draw the surface of the equation

$z = xe^{-x^2 - y^2}$ in the range $-3 \le x \le 3$ and $-3 \le y \le 3$.

10. Write a script in MATLAB to draw the contour of the equation $z = \sin x + \cos y$ in the range $-2\pi \le x \le 2\pi$ and $0 \le y \le 4\pi$.

11. Write a script in MATLAB to find the histogram of the following set of data

$\{(x_i, y_i, z_i) : i = 1, 2, ..., n\}$.

12. Generate pie chart of 35, 42, 25, 36, 29, 16.

Group C

Select *one* question on lottery basis.   8×1

1. Write a user defined function 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 $x^3 + 2x - 5 = 0$.

2. Write a user defined function in MATLAB to calculate correlation coefficient of two set of numbers and using this find the correlation coefficient of the following sets numbers : $\{7, 8, 9, 6, 3, 9, 8, 5, 7, 11\}$ and $\{5, 6, 7, 1, 7, 6, 3, 5, 9\}$.

3. Write a user defined function 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 $\int_0^1 xdx$ by dividing 100 sub-intervals.

(Continued)

4. Write a user defined function 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 integral $\int_0^1 x^2 dx$ by dividing 100 sub-intervals.

5. Write a script in MATLAB to find the real root of the equation $x^3 + x - 5 = 0$ by bisection method.

6. Write a script in MATLAB to find the value of $\int_0^1 x^2 dx$ by

dividing 100 sub-intervals using Simpson 1/3'r rule.

7. Write a script in MATLAB to find the mean of the following numbers : 7, 8, 9, 6, 3, 9, 8, 5, 7, 11.

8. Write a script in MATLAB to find the standard deviation of the following numbers : 7, 8, 9, 6, 3, 9, 8, 5, 7, 11.

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

(Turn Over)

10. Write a script in MATLAB to fit a polynomial curve of any degree to the following data

$\{(x_i, y_i) : i = 1, 2, ..., n\}$.

11. Calculate standard deviation of the following numbers : 8, 9, 10, 7, 4, 10, 9, 6, 8, 12.

Note book and Viva : 05 Marks.

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