

PG (NEW) CBCS
M.Sc. Semester-I Examination, 2018
MATHEMATICS
PAPER: MTM-197

(CLASSICAL MECHANICS AND NON-LINEAR DYNAMICS)

Full Marks: 50

Time: 3 Hours

Answer any one question in MATLAB from each group on lottery basis.

(LNB: 5, Experiment: 20)

Group A

Select one question in Lottery basis. ($6 \times 1 = 6$)

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| <ol style="list-style-type: none"> 1. Test whether a number is Palindrome or not. 2. Find the prime factors of a given number. 3. Calculate ${}^n C_r$. 4. Write program in MATLAB to generate Fibonacci series. 5. Find the roots of the equation $X^2+5x+6 = 0$ | <ol style="list-style-type: none"> 6. Find the trace of a square matrix. 7. Test a number whether it is divisible by another number or not. 8. Write a program to find whether a number is prime or not and using this generate all the prime numbers between two specified numbers. |
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Group B

Select one question in Lottery basis. ($6 \times 1 = 6$)

1. Generate a Pie chart of 35, 42, 25, 36, 29, 16.
2. Write a script in MATLAB to find the histogram of following set of data $\{x_i, y_i, z_i : i = 1, 2, 3, \dots, n\}$
3. 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 $-3 \leq y \leq 3$
4. Write a script in MATLAB to draw the following function in the interval $\{-1, 4\}$

$$f(x) = \begin{cases} x^2 + 1 & -1 \leq x < 0 \\ 0 & x = 0 \\ x^3 + 2x + 5 & x > 0 \end{cases}$$
5. Write a script in MATLAB to draw $y = |x|$ in the interval $[-4, 4]$. Mention title, axes and axes limits.
6. 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.
7. 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

Select one question in Lottery basis. ($8 \times 1 = 8$)

1. Write a script in MATLAB to find the real root of the equation $x^3 + x - 5 = 0$ by Bisection method.
2. 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.
3. Write a script in MATLAB to find the mean of the following numbers 7, 9, 8, 6, 3, 9, 8, 5, 7, 11.
4. Write a script in MATLAB to find the deviation of the following numbers 7, 8, 9, 10, 11, 12, 13, 15, 17.
5. 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.

