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PG CBCS
M.SC. Semester-I Examination, 2021
MATHEMATICS
PAPER: MTM 197 (PRACTICAL)
(COMPUTATIONAL METHODS: USING MATLAB)

Full Marks: 25 **Time: 1 Hour**

Group-A

Answer any one question: **15X1=15**

1. For a diagonalizable matrix A, write a function program that returns true if A is positive definite and false otherwise. Also, write a script program to illustrate it.
2. Write a user define function to find the value of $\int_a^b f(x)dx$ by Simpson 1/3's rule. Use this function; write a script program to find the value of the following integration $\int_0^1 x^2 + xdx$.
3. Write a MATLAB function program to find a real root of the equation $x^2 - sin2x - 1 = 0$ by Newton-Raphson's method.
4. Write a user defined function in MATLAB to determine the roots of a quadratic equation. Use this function; write a script find the roots of the equation $x^2 + 5x + 6 = 0$.

Group-B

Answer any one question: **10X1=10**

1. Write a script program to represent the graphs of the functions $sinx$, $sin2x$ and $sin3x$ in the range $0 < x < 2\pi$ in same figure on the same axes with different line specifications. Also, put the text in each graph to identify the graphs.
2. Write a script program to solve the following linear equations

$$3x + 5y = 6z = 6$$
$$8x - y + 2z = 1$$
$$5x - 6y - 4z = -5$$

   using rref, pinv, and left division methods.
3. Write a script program to create a mesh, surface and contour plots of the function $z = e^{x+iy}$ in the interval $-1 < x < 1$ and $-2\pi < y < 2\pi$. In each case plot the real part of z versus x and y.
4. Write a script file to compute the sum of the first n terms in the series $5k^2 - k, k = 1, 2, 3, \dots, n$.

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