

Visvesvaraya National Institute of Technology, Nagpur
Department of Mathematics
III Semester B.Tech. (Civil & Mining) Second Sessional Examinations
Numerical Analysis (MAL 202)

Max Marks: 15

Date: 18 – 10 – 2014

Duration: 1 hour (4.00 PM – 5.00 PM)

Note: Answer any Five questions, all questions carry equal marks.

1. Find $f'(1.2)$, $f''(1.2)$ and $f'(2)$ from the following data:

x	1	1.2	1.4	1.6	1.8	2	2.2
$f(x)$	2.7183	3.3201	4.0552	4.953	6.0496	7.3891	9.025

2. Find the approximate value of $I = \int_0^1 \frac{dx}{1+x}$ using (i) Trapezoidal rule (ii) Simpson's $\frac{1}{3}$ rule. Also obtain the error bounds.
3. Evaluate the integral $I = \int_1^2 \frac{2t}{1+t^4} dt$ using Gauss Legendre three point formula.
4. Find the inverse of the matrix $\begin{bmatrix} 2 & -1 & 2 \\ -1 & 1 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ by the Cholesky method.
5. Consider the system of equations $4x + y + 2z = 4$, $3x + 5y + z = 7$, $x + y + 3z = 3$. Set up the Gauss Seidel iterative scheme for the solution and iterate three times starting with the initial vector $(0, 0, 0)^T$.

6. Find the largest eigen value of the matrix $A = \begin{bmatrix} 2 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 2 \end{bmatrix}$ using Power method.