

Question Bank for PG Course

অঙ্ক (Mathematics)

চতুর্থ (ক) পত্র (Paper - IVA)

Numerical Analysis : PGMT-IVA

1. Find the approximate number of arithmetic operations in Gauss elimination method of solution of a system of equations.
2. What is the condition number of a matrix A?
3. If $T_n(x) = \cos(n \cos^{-1} x)$ represents n^{th} degree Chebyshev polynomial, then state the triple recurrence relation for it.
4. Find the maximum possible value of the degree of precision for a quadrature formula with $\{n + 1\}$ nodes.
5. Find the leading coefficient of $T_n(x)$, the n^{th} order Chebyshev polynomial for $n \geq 1$.
6. What is the order of convergence of Newton- Raphson method?
7. Which of the following methods is/are single step method of solving differential equation?
 - i) Adams-Bashforth Method
 - ii) Adams –Moulton Method
 - iii) Runge- Kutta Method
 - iv) Milne’s Method
8. Given $y' = y^2 - x^2$, where $y(0) = 2$. Find $y(0.1)$ by second order Runge –Kutta method.
9. When does a linear multi-step method with step length h of solving differential equation called of order p ?
10. Find the stability region for Euler’s method of solution of the differential equation $y' = \lambda y$, $y(0) = y_0$.
11. Write down the end conditions under natural and periodic cubic spline $S(x)$ from $[a, b] \rightarrow R$.
12. Which are the numerical problems solved by the Finite difference method?
13. A curve is drawn to pass through the points given in the following table:

x	1	1.5	2	2.5	3	3.5	4
y	2	2.4	2.7	2.8	3	2.6	2.1

Estimate by Simpson’s 1/3 rule, the area bounded by the curve, X axis and the lines $x = 1$, $x = 4$.

14. Find , by Regula Falsi method, the real root of the equation $x^3 - 3x - 5 = 0$ in $[2, 3]$ correct to two decimal places.

15. Fit a straight line to the set of points $(0, 1.0)$, $(1, 2.9)$, $(2, 4.8)$, $(3, 6.7)$, $(4, 8.6)$ by the least square principle.