

Question Bank For PG Course

Mathematics

Paper-4A

NUMERICAL ANALYSIS : PGMT-IVA

Question 1

Find the approximate number of arithmetic operations in Gauss elimination method of solution of a system of equations.

Question 2

What is the condition number of a matrix A?

Question 3

If $T_n(x) = \cos(n \cos^{-1} x)$ represents n^{th} degree Chebyshev polynomial, then state the triple recurrence relation for it.

Question 4

Find the maximum possible value of the degree of precision for a quadrature formula with $\{n + 1\}$ nodes.

Question 5

Find the leading coefficient of $T_n(x)$, the n^{th} order Chebyshev polynomial for $n \geq 1$.

Question 6

What is the order of convergence of Newton- Raphson method?

Question 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

Question 8

Given $y' = y^2 - x^2$, where $y(0) = 2$. Find $y(0.1)$ by second order Runge –Kutta method.

Question 9

When does a linear multi-step method with step length h of solving differential equation called of order p ?

Question 10

Find the stability region for Euler’s method of solution of the differential equation $y' = \lambda y$, $y(0) = y_0$.

Question 11

Write down the end conditions under natural and periodic cubic spline $S(x)$ from $[a, b] \rightarrow \mathbb{R}$.

Question 12

Which are the numerical problems solved by the Finite difference method?

Question 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 $x = 1$, $x = 4$.

Question 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.

Question 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.

Question 16

Which error is better for comparing among set of numbers ?

i. Absolute error ii. Relative error

Question 17

Correct the following number upto 4 significant digits.

0.00340200

Question 18

Is Gauss Jacobi method for solution of system of linear equations direct method?

Question 19

Can tri-diagonal system be solved by LU decomposition method?

Question 20

True or False: Eigen vectors corresponding to different eigen values are linear independent.

Question 21

What is the convergence rate of Newton-Raphson method ?

Question 22

True or false: Cubic spline is continuously differentiable function

Question 23

What is the upper bound of the degree of precession of quadrature formula with $n+1$ nodes?

Question 24

What can be said about the continuity of Lipschitz function ?

Question 25

Is modified Euler is a multi-step method ?

Question 26

On which side has second order RK method stable more?

Question 27

Is finite difference method applicable for second order differentiable equation of boundary value problems?

Question 28

What is the degree of precession of simpson 1/3 rule?

Question 29

What is the condition of convergence of fixed point iteration method, for $x=\phi(x)$?

Question 30

What do you mean by ill-conditioned systems?
