



Department of Mechanical Engineering

MA8452 – Statistics and Numerical Methods

Unit I - MCQ Bank

1. The convergence of which of the following method is sensitive to starting value?

- A. False position
- B. Gauss seidal method
- C. **Newton-Raphson method**
- D. All of these

Answer: (C)

2. We wish to solve $x^2 - 2 = 0$ by Newton Raphson technique. If initial guess is $x_0 = 1.0$, subsequent estimate of x (i.e. x_1) will be

- A. 1.414
- B. **1.5**
- C. 2
- D. 2.5

Answer: (B)

3. In the Gauss elimination method for solving a system of linear algebraic equations, triangularization leads to

- A. Diagonal matrix
- B. Lower triangular matrix
- C. **upper triangular matrix**
- D. Singular matrix

Answer: (C)

4. Newton-Raphson method is applicable to the solution of

- A. **Both algebraic and transcendental Equations** Gauss seidal method
- B. Both algebraic and transcendental and also used when the roots are complex
- C. Algebraic equations only

D. Transcendental equations only

Answer: (A)

5. The root of $x^3 - 2x - 5 = 0$ correct to three decimal places by using Newton-Raphson method is

A. 2.0946

B. 1.0404

C. 1.7321

D. 0.7011

Answer : (A)

6. Find the values of x, y, z in the following system of equations by gauss Elimination Method.

$$2x + y - 3z = -10 \quad -2y + z = -2 \quad \text{and} \quad z = 6$$

A. 2, 4, 6

B. 2, 7, 6

C. 3, 4, 6

D. 2, 4, 5

Answer : (A)

7. In Gaussian elimination method, original equations are transformed by using _____

A. Column operations

B. Row operations

C. Mathematical Operations

D. Subset Operation

Answer : (B)

8. Which of the methods is direct method for solving simultaneous algebraic equations?

A. Jacobi's method

B. Relaxation method

C. Gauss elimination

D. Gauss seidel method

Answer : (C)

9. Direct methods are preferred over iterative methods as they provide solution faster.

A. True

B. False

Answer : (B)

10. What are the advantages of direct methods for solving the simultaneous algebraic equations?

A. Rounding of errors get propagated

B. Quite time consuming

C. Requires more recording of data

D. Yield a solution after a finite number of steps for any non-singular set of equation

Answer : (D)

11. The process of constructing a sequence of vectors and obtaining the solution of a system using specified accuracy is called _____

A. Elimination

B. Reduction

C. Iteration

D. Raphson method

Answer : (C)

12. What is the primary drawback of using direct methods of solution?

A. They yield solution after a certain amount of fixed computation

- B. They have large calculations involved
- C. They make use of back substitution
- D. They do not achieve the desirable accuracy

Answer : (A)

13. . Iteration is also called as _____

- A. Accurate process
- B. Self-correcting process**
- C. Approximate process
- D. Rounding off process

Answer : (B)

14. Which of the following is an iterative method?

- A. Gauss Jordan
- B. Gauss Elimination
- C. Gauss seidal**
- D. Factorization

Answer : (C)

15. . Why iterative methods are called as self correcting

- A. Checks occurring during the process ensure that the errors are reduced
- B. Any error made at any stage of computation gets automatically corrected in the subsequent steps
- C. After each step, validity of the method is checked.**

Answer : (C)

16. The Jacobi iteration converges, if A is diagonally dominant

A. True

B. False

Answer: (A)

17. In Jacobi's Method, the rate of convergence is quite _____ compared with Gauss Siedal methods.

A. Slow

B. Fast

Answer: (A)

18. The Jacobi's method is a method of solving a matrix equation on a matrix that has no zeroes along _____ .

A. Leading diagonal

B. Last column

C. Last row

D. Non-leading diagonal

Answer: (A)

19. Matrix which does not have an inverse by solving it, is classified as which of the following.

A. unidentified matrix

B. linear matrix

C. non-singular matrix

D. singular matrix

Answer: (D)

20. What type of eigen value can be obtained using Power method?

- A. All eigen values
- B. positive eigen values
- C. equal eigen values
- D. dominant eigen value**

Answer : (D)

21. Iterative formula to find \sqrt{N} using Newton-Raphson method is

- A. $X_{n+1} = \frac{1}{2} \left[x_n - \frac{N}{x_n} \right]$
- B. $X_{n+1} = \left[x_n + \frac{N}{x_n} \right]$
- C. $X_{n+1} = \frac{1}{2} \left[x_n + \frac{N}{x_n} \right]$
- D. $X_{n+1} = \left[x_n - \frac{N}{x_n} \right]$

Answer : (C)

22. The rate of convergence of Newton Raphson method is of order

- A. 1
- B. 2**
- C. 3
- D. 4

Answer : (B)

23. The condition for convergence of fixed point iteration method is

A. $|f(x)f''(x)| < |f'(x)|^2$

B. $|g(x)| < 1$

C. $|f(x)f'(x)| < |f'(x)|^2$

D. $|g'(x)| < 1$

Answer : (D)

24. The direct methods for solving simultaneous equations are

A. Gauss elimination

B. Gauss Jordan

C. Both A and B

Answer : (C)

25. $3x - \cos x - 1 = 0$ is

A. Algebraic

B. Transcendental

Answer : (B)