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MA8491-NUMERICAL METHODS
UNIT-I-SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS

1. If g(x) is continuous in [a,b], then under what condition the iterative (or) iteration method x = g(x) has a unique solution in [a,b]?

A. $|\varphi'(x)| = 1$
B. $|\phi'(x)| < 1$
C. $|\varphi'(x)| > 1$
D. $|\varphi'(x)| \leq 1$

Answer: (B)

2. What is the other name for iteration method?

A. Direct method
B. Successive approximation method
C. Power method
D. Jacobi method

Answer: (B)

3. What is the order of convergence of fixed point iteration method?

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

Answer: (A)

4. The formula for iteration method is

A. $x_{n+1} = \phi(x_n)$
B. $x_{n-1} = \phi(x_n)$
C. $x_n = \phi(x_n)$
D. $x_n = \phi(x_{n+1})$

Answer: (A)

5. The condition for the convergence of Newton -Raphson method is

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

B. $|f(x)f''(x)| = |f(x)|^2$

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

D. $|f(x)f''(x)| \leq |f'(x)|^2$

Answer: (C)

6. What is the order of convergence for Newton-Raphson method?

A. 1

B. 2

C. 3

D. 4

Answer: (B)

7. Newton-Raphson method is also known as

A. Gauss Elimination method

B. method of Tangents

C. Gauss –Jacobi method

D. Power method

Answer: (B)

8. The iterative formula to find $\sqrt{N}$ using Newton-Raphson method is

A. $x_{n+1} = \frac{x^2_n + N}{x_n}$

B. $x_n = \frac{x^2_n + N}{2x_n}$

C. $x_{n+1} = \frac{x^2_n - N}{2x_n}$

D. $x_{n+1} = \frac{x^2_n + N}{2x_n}$

Answer: (D)

9. The iterative formula to find cube root of N using Newton-Raphson method is

A. $x_{n+1} = \frac{x_n{}^3 + N}{3x_n{}^2}$

B. $x_{n+1} = \frac{2x_n{}^3 + N}{x_n{}^2}$

C. $x_{n+1} = \frac{2x_n^3 + N}{3x_n^2}$

D. $x_{n+1} = \frac{3x_n^3 + N}{2x_n^2}$

Answer: (C)

10. The iterative formula to find the reciprocal of a positive number using Newton-Raphson method is

A. $x_{n+1} = x_n(3 - Nx_n)$

B. $x_{n+1} = x_n(2 - Nx_n)$

C. $x_{n+1} = x_n(2 + Nx_n)$

D. $x_{n+1} = x(2 - Nx_n)$

Answer: (B)

11. The indirect methods to solve the system of equations is

A. Gauss Elimination
B. Gauss Jordan
C. Crouts
D. Gauss seidel
Answer: (D)

12. From the following which method is called as iterative methods
A. Gauss Elimination method
B. Gauss Jordan method
C. Gauss –Jacobi method
D. Power method
Answer: (C)

13. What type of solutions can be get by using direct methods

A. exact value
B. approximate value
C. moderate value
D. positive value
Answer: (A)

14. What type of solutions can be get by using indirect methods
A. exact value
B. approximate value
C. moderate value
D. positive value

Answer: (B)

15. In Gauss Elimination method the coefficient matrix is reduced to

A. diagonal matrix
B. singular matrix
C. lower triangular matrix
D. upper triangular matrix
Answer: (D)

16. In Gauss Jordan method the coefficient matrix is reduced to

A. diagonal matrix
B. singular matrix
C. lower triangular matrix
D. upper triangular matrix
Answer: (A)

17. If in each equation of the given system, the absolute value of the largest coefficient is greater than the sum of the absolute values of all the remaining coefficients is called

A. diagonally dominant
B. dominant
C. absolute value
D. minimum value
Answer: (A)

18. Solve x + y = 2 ; 2x + 3y = 5 by Gauss Elimination method.

A. (1,1)
B. (1,2)
C. (2,1)
D. (1,-1)
Answer: (A)

19. Solve 3x + 2y = 4 ; 2x - 3y = 7 by Gauss Jordan method.

A. (1,1)
B. (1,2)
C. (2,1)
D. (1,-1)
Answer: (C)

20. Solve x -2y = 0 ; 2x + y = 5 by Gauss Elimination method.

A. (1,1)
B. (1,2)
C. **(2,1)**
D. (1,-1)
Answer: (C)

21. Solve 2x + y = 3 ; 7x - 3y = 4 by Gauss Jordan method.

A. (1,1)
B. (1,2)
C. (2,1)
D. (1,-1)
Answer: (A)

22. Gauss-Seidel method is twice faster than ---------method.

A. Gauss Elimination method
B. Gauss Jordan method
C. Gauss –Jacobi method
D. Power method
Answer: (C)

23. Gauss-Seidel method is better than Gauss –Jacobi method?

A. True
B. False
Answer: (A)

24. What type of eigenvalue can be obtained using power method?

A. simple
B. negative
C. medium
D. dominant
Answer: (D)

25. For what type of matrices, Jacobi's method can be used to find eigen values and eigenvectors?

A. non- symmetric
B. diagonal
C. singular
D. symmetric
Answer: (D)