3rd semester M-1 MCQ (Multiple Choice Questions)

Q:(1) Find the root of $x^4 - x - 10 = 0$ approximately up to 5 iterations using Bisection Method. Let $a = 1.5$ and $b = 2$

(a) 1.68 (c) 1.88

(b) 1.86 (d) 1.66

Q:(2) If a function is real and continuous in the region from a to b and f(a) and f(b) have opposite signs there is no real root between a and b.

(a) True (c) both (a) & (b)

(b) False (d) None

Q:(3) A function is given by $x - e^{-x} = 0$. Find the root between $a = 0$ and $b = 1$ by using Bisection method.

(a) 0.655 (c) 0.565

(b) 0.665 (d) 0.656

Q:(4) The Bisection Method is also known as

(a) Binary Chopping

(b) Quaternary Chopping

(c) Tri region Chopping

(d) Hex region Chopping.

Q:(5) A function is defined as $f(x) = x^2 - 3$ between the interval [1,2] find the root of the function by Bisection method

(a) 1.7334 (c) 1.7354

(b) 1.7364 (d) 1.7344

Q:-(6) find the roots of an equation $f(x)=0$ by using Bisection method

(a) $x_{n+1} = \frac{x_n - x_{n-1}}{2}$ (c) $x_n = \frac{x_{n+1} - x_{n-1}}{2}$

(b) $x_{n+1} = \frac{x_n + x_{n-1}}{2}$ (d) $x_n = \frac{x_{n+1} + x_{n-1}}{2}$

Q:-(7) Find the interval in which the root of the equation $x^3-5x+1=0$ must lie?

(a) (0, 1) (c) (5, 6)

(b) (4, 5) (d) None

Q:-(8) Find the approximated value of x till 4 iterations for $e^{-x}=3\log(x)$ using bisection method.

(a) 1.197 (c) 1.167

(b) 1.187 (d) 1.176

Q:-(9) Find a root of $f(x)=3x+\sin x-e^x=0$. Use 6 iterations to find the approximate value of x.

(a) 0.3605

(b) 0.3650

(c) 0.3615

(d) 0.3655

Q:(10) Rate of convergence of the Newton-Raphson Method is generally _____

(a) Linear (c) Super-linear

(b) Quadratic (d) Cubic

Q:(11) The iterative formula for Newton Raphson Method is given by _____

(a) $x_0 = x_1 - \frac{f(x_0)}{f'(x_0)}$

(b) $x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$

(c) $x_0 = x_1 + \frac{f(x_0)}{f(x_0)}$

(d) $x_1 = x_0 + \frac{f(x_0)}{f'(x_0)}$

Q:(12) In Newton Raphson Method if the curve $f(x)$ is constant then _____

(a) $f''(x) = 0$ (c) $f'(x) = 0$

(b) $f(x) = 0$ (d) $f'(x) = c$

Q:(13) The equation $f(x)$ is given as $x^2 - 4 = 0$. Considering the initial approximation at $x = 6$ then the value of next approximation correct up to 2 decimal places is given as _____

(a) 3.33 (c) 2.33

(b) 1.33 (d) 4.33

Q(14) The Newton Raphson method fails if _____

(a) $f'(x_0) = 0$ (c) $f(x_0) = 0$

(b) $f''(x_0) = 0$ (d) $f'''(x_0) = 0$

Hints:

When $f'(x_0)$ becomes zero then the value of $\frac{f(x_0)}{f'(x_0)}$ becomes ∞. Hence Newton Raphson method fails at $f'(x_0)=0$

Q:(15) The Newton-Raphson method to finding roots of nonlinear equations falls under the category of which of the following methods?

(a) Bracketing (c) Random

(b) Open (d) Graphical

Q:(16) The Newton Raphson method is also called as _____

(a) Tangent method

(b) Secant Method

(c) Chord Method

(d) Diameter method

Q:(17) For decreasing the number of iterations in Newton Raphson method.

(a) The value of $f'(x)$ must be increased

(b) The value of $f''(x)$ must be decreased

(c) The value of $f'(x)$ must be decreased

(d) The value of $f''(x)$ must be increased

Q:-(18) In which method rate of convergence faster
(a) false position method
(b) N-R method
(c) Bisection method
(d) None

Q:-(19) The points where the Newton Raphson method fails are called?
(a) Floating
(b) Continuous
(c) non-stationary
(d) Stationary

Q:-(20) The convergence of which of the following Method depends on initial assumed value?
(a) Gauss Seidel method
(b) False position Method
(c) Newton Raphson method
(d) Euler method

Q:-(21) What is the region of convergence of secant Method?
(a) 1.538
(b) 1.265
(c) 1.618
(d) 1.679

Q:-(22) Secant method is also called as?
(a) 2-point method
(b) 3-point method
(c) 4-point method
(d) 5-point method

Q:-(23) Secant method converges faster than Bisection Method.

(a) True
(b) False
(c) both (a) & (b)
(d) None

Q:-(24) Secant method is slower than Newton Raphson Method.

(a) True
(b) False
(c) both (a) & (b)
(d) None

Q:-(25) A quadratic equation $x^2-4x+4=0$ is defined with an initial guess of 10 and 20. Find the approximated value of x_2 using secant method

(a) 7.538
(b) 7.853
(c) 7.358
(d) 7.835

Q:-(26) Secant Method is slower than Newton Raphson method.

(a) True
(b) False
(c) both (a) & (b)
(d) None

Q:-(27) The number of iterations in Secant Method are less as compared to Newton Raphson.

(a) True
(b) False
(c) both (a) & (b)
(d) None

Q:-(27) Gauss seidel method is also termed as a method of _____

(a) Successive displacement
(b) Eliminations
(c) False positions
(d) Iterations

Q:-(28) Gauss seidel method is similar to which of the following methods?

(a) Iterations method
(b) Newton Raphson method
(c) Jacobi's method
(d) Regula-falsi method

Q:-(29) The Gauss-seidel method is applicable to strictly diagonally dominant or symmetric _____ definite matrices.

(a) Negative (c) zero
(b) Positive (d) Equal

Q:-(30) Which of the following method is employed for solving the system of linear equations?

(a) Runge Kutta (c) Simpson's Rule
(b) Newton Raphson (d) Gauss seidel

Q:-(31) Gauss Seidel requires less number of iterations than Jacobi's method.

(a) True (c) both (a) & (b)

(b) False (d) None

Q:-(32) Solve the following equation by Gauss Seidel method up to 2 iterations and find the value of z.

$$27x+6y-z=85$$
$$6x+15y+2z=72$$
$$x+y+54z=110$$

(a) 1.88 (c) 0

(b) 1.22 (d) 1.92

Q:-(33) What is the limitations of Gauss-Seidel method?

(a) It can not be used for the matrices with non-zero diagonal elements.

(b) It is more complex than Jacobi's method

(c) It does not guarantees convergence for each and every matrix.

(d) It is an iterative technique

Q:(34) Which of the following system of linear equations has a strictly diagonally dominant coefficient Matrix.

(a) $3x - y = -4$
$2x + 5y = 2$

(b) $2x + y = 1$
$x - 7y = 4$

(c) $3x + 5y = 2$
$x + y = -3$

(d) $4x = 2y - z - 1$
$x + z = -4$
$3x - 5y + z = 3$

Hints: $A = \begin{bmatrix} 3 & -1 \\ 2 & 5 \end{bmatrix}$ $|3| > |-1|$ and $|5| > |2|$

Q:(35) Which of the following is another name for Jacobi's method?

(a) Displacement Method
(b) Simultaneous displacement Method
(c) Iteration Method
(d) Diagonal Method

Q:(36) Solve the system of equations by Jacobi's iteration method

$$10a - 2b - c - d = 3$$
$$-2a + 10b - c - d = 15$$
$$-a - b + 10c - 2d = 27$$
$$-a - b - 2c + 10d = -9$$

(a) $a = 1, b = 2, c = 3, d = 0$
(b) $a = 2, b = 1, c = 9, d = 5$
(c) $a = 2, b = 2, c = 9, d = 0$
(d) $a = 1, b = 1, c = 3, d = 5$

Q:-(37) Solve the system of equations by Jacobi's iteration Method.

$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25$$

(a) $x = 1,\ y = -1,\ z = 1$
(b) $x = 2,\ y = 1,\ z = 0$
(c) $x = 2,\ y = 1,\ z = 3$
(d) $x = 2,\ y = 5,\ z = 7$

Q:-(38) In Jacobi's method, the rate of convergence is quite _____ compared with other methods.

(a) Fast (c) Slow
(b) Weak (d) Strong

Q:-(39) How many assumptions are there in Jacobi's method?

(a) 3 (c) 4
(b) 2 (d) 5

Q:-(40) 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

Q:(41) What is the other name for LU decomposition method?

(a) Doolittle's method (c) Factorization method
(b) Mullen's method (d) Lin Bairstow method

Q:(42) Factorization method is superior than which of the following Methods?

(a) Gauss elimination (c) Jacobi's method
(b) Gauss seidel (d) Iterative Method

Q:(43) While solving a system of linear equations the decomposed matrices; L and U? Which of the following will be the order of

(a) order of $L = 3\times1$, order of $U = 1\times3$
(b) order of $L = 3\times2$; order of $U = 2\times3$
(c) order of $L = 3\times3$; order of $U = 3\times3$
(d) None

Q:(44) Apply factorization (LU) method for solving the following equations

$$2x+3y+z=9$$
$$x+2y+3z=6$$
$$3x+y+2z=8$$

(a) $y=\frac{1}{2}$, $z=\frac{1}{2}$, $x=\frac{7}{2}$
(b) $y=\frac{1}{2}$, $z=7/2$, $x=\frac{9}{2}$
(c) $y=\frac{3}{2}$, $z=7/2$, $x=\frac{3}{2}$
(d) $y=\frac{5}{2}$, $z=\frac{1}{2}$, $x=3/2$

Q:(45) Solve the following equations using Crout's method to find the value of x

$$x+y+z=7$$
$$x+2y+3z=16$$
$$x+3y+4z=22$$

(a) 3 (c) 0
(b) 7 (d) 1

Q:(46) Solve the following equations using Crout's Method to find the value of z

$$x-2y+3z=6$$
$$x-y+2z=9$$
$$3x+2y-z=16$$

(a) 13 (c) 10
(b) 7 (d) -12

Q:(47) When Cholesky method can be used for solving system of linear equations?

(a) Co-efficient matrix is square
(b) Co-efficient matrix is symmetric
(c) Co-efficient matrix is asymmetric
(d) Co-efficient matrix is identity matrix.

Q:(55) If $f(1)=2$, $f(2)=4$ and $f(4)=16$, What is the value of $f(3)$ using Lagrange's interpolation formula?

(a) 8 (c) $\frac{82}{3}$

(b) $\frac{81}{2}$ (d) 9

Q:(56) Lagrange's interpolation formula can be used

(a) only for equally spaced intervals

(b) only for unequally spaced intervals

(c) both (a) & (b)

(d) none

Q:(57) Let f, g be polynomials with $\deg f = 3$, $\deg g \leq 3$. Suppose $f(x) = g(x)$ for $x = 1, 2, 3, 4$ What is the degree of g?

(a) 0 (b) 1

(c) 2 (d) 3

Hints: Since g ~~degree~~ agrees with f at 4 points, and both f, g have degree at most 3, we must have $f = g$. Thus the degree of g is also 3.

Q:(48) Which of the following is an iterative method?

(a) Gauss-Jordan (c) Gauss Seidel

(b) Gauss Elimination (d) Factorization

Q:(49) Number of iteration depends on the ——

(a) Number of unknowns

(b) Type of linear equations

(c) Initial value taken to start the iteration

(d) Approximations to be done

Q:(50) Newton-Gregory forward interpolation formula can be used ——

(a) only for equally spaced intervals.

(b) only for unequally spaced intervals.

(c) For both equally and unequally spaced intervals.

(d) None

Q:(51) Find n if $x_0 = 0.75825$, $x = 0.759$ and $h = 0.00005$

(a) 1.5 (c) 2.5

(b) 15 (d) 25

Hints: $x_0 = 0.75825$, $x = 0.759$, $h = 0.00005$

$x = x_0 + nh$

$0.759 = 0.75825 + n(0.00005)$

$\therefore n = 15.$

Q:(52) Find x if $x_0 = 0.6$, $n = 2.6$, and $h = 0.2$

(a) 12 (c) 1.12

(b) 1.2 (d) 1.22

Hints:

$x = 0.6 + (0.2)(2.6)$

$x = 1.12$

Q:(53) Find the polynomial for the following data.

x	4	6	8	10
$f(x)$	1	3	8	16

(a) $\frac{3x^2 - 22x + 36}{8}$ (b) $3x^2 - 22x + 36$

(c) $\frac{3x^2 + 22x + 36}{2}$ (d) $\frac{3x^2 - 19x + 36}{8}$

Q:(54) Find $F(5)$ using N.F.I.F from the following table.

x	0	2	4	6	8
$f(x)$	4	26	58	112	466

(a) 61.103975

(b) 70.103975

(c) 71.109375

(d) 72.103795