**Paper Code - 3691**

# M.Sc. (C.A. & IT) Semester-III (New Course)

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## 301 Numerical Methods

કુલ સમય :– : ૬૦ મીનીટ  કુલ પ્રશ્નો : ૫૦  વિદ્યાર્થીએ ટીક કરવાના પ્રશ્નો : ૩૫

**નોંધ : વિદ્યાર્થીએ માત્ર ૩૫ પ્રશ્નો જ ટીક કરવાના રહેશે. જો વધારે ટીક કરેલ હશે તો પ્રથમ ૩૫ પ્રશ્નો જ ગણતરીમાં લેવામાં આવશે.**

1) The secant method of finding roots of nonlinear equations falls under the category of methods.
   (a) Bracketing (b) Graphical (c) Open (d) Random
2) 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
3) Using Newton-Raphson method, find a root correct to three decimal places of the equation $x^3 - 3x - 5 = 0$
   (a) 2.275 (b) 2.279 (c) 2.222 (d) None of these
4) Newton-Raphson method is applicable to the solution of
   (a) Both algebraic and transcendental Equations
   (b) Both algebraic and transcendental and also used when the roots are complex
   (c) Algebraic equations only
   (d) Transcendental equations only
5) Using Bisection method, negative root of $x^3 - 4x + 9 = 0$ correct to three decimal places is
   (a) -2.506 (b) -2.706 (c) - 2.406 (d) None of these
6) The value of x that satisfies f(x) = 0 is called the
   (a) root of an equation f(x) = 0 (b) root of a function f(x)
   (c) zero of an equation f(x) = 0 (d) none of the above
7) If a function is real and continuous in the region from a to b and f(a) and f(b) have opposite signs then there is no real root between a and b.
   (a) True (b) False
8) The bisection method of finding roots of nonlinear equations falls under the category of a (an) _____ method.
   (a) Open (b) Bracketing (c) Random (d) Graphical
9) In False position method, We decide that 2 such that f(2) = 8 will be one of our initial points. Which of the following is appropriate choice for the second point?
   (a) 1 such that f(1) = 1 (b) -1 such that f(-1) = -1 (c) 3 such that f(3) = 27 (d) none of the above
10) Which of the following statements applies to the bisection method used for finding roots of functions?
   (a) No one of following
   (b) Guaranteed to work for all continuous functions
   (c) Is faster than the Newton-Raphson method
   (d) Requires that there be no error in determining the sign of the function
11) The formula used for solving the equation using Regula Falsi method is $X2 = \frac{X0 * f(x1) - X1 * f(X0)}{f(X1) - f(X0)}$
   (a) True (b) False
12) In Newton Raphson method f'(x) for a given point is given by the formula _____.
   (a) y/x' (b) y'/x (c) y/x (d) y'/x'
13) The convergence of which of the following method depends on initial assumed value?
   (a) False position (b) Gauss Seidel method (c) Newton Raphson method (d) Euler method
14) To solve the ordinary differential equation $3\frac{dy}{dx} + 5y2 = \sin x, y(0)=5$, by Euler's method, you need to rewrite the equation as
   (a) $\frac{dy}{dx} = \sin x - 5y^2, y(0) = 5$ (b) $\frac{dy}{dx} = \frac{1}{3}(\sin x - 5y^2), y(0) = 5$
   (c) $\frac{dy}{dx} = \frac{1}{3}\left(-\cos x - 5\frac{y^3}{3}\right), y(0) = 5$ (d) $\frac{dy}{dx} = \frac{1}{3}\sin x, y(0) = 5$
15) What is the order of the differential equation given by $\frac{dy}{dx} + 4y = sinx$ ?
   (a) 0.5 (b) 1 (c) 2 (d) 0
16) Match the following:

| | |
|---|---|
| A. Newton-Raphson | 1. Integration |
| B. Runge-kutta | 2. Root finding |
| C. Gauss-seidel | 3. Ordinary Differential Equations |
| D. Simpson's Rule | 4. Solution of system of Linear Equations |

   (a) A2-B3-C4-D1 (b) A3-B2-C1-D4 (c) A1-B4-C2-D3 (d) A4-B1-C2-D3

17) The value of $\int_{0.2}^{2.2} xe^x dx$ by using the three-segment trapezoidal rule is most nearly
(a) 11.672 (b) 11.807 (c) 12.811 14.633

18) $\int_1^2 x^2\, dx\ is$
(a) 1 (b) $\frac{7}{3}$ (c) $\frac{1}{3}$ (d) 0

19) The time taken to solve a system of equations using direct method is more than the time taken by iterative methods.
(a) True (b) False

20) Numerical techniques more commonly involve _____
(a) Iterative method (b) Direct method (c) Elimination method (d) Reduction method

21) 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

22) In an iterative method, the amount of computation depends on the _____
(a) Number of variables (b) Degree of accuracy (c) Rounding of errors Ease of using the operators

23) Iteration is also called as __
(a) Accurate process (b) Self-correcting process (c) Approximate process (d) Rounding off process

24) Number of iteration depends on the _____
(a) Initial value taken to start the iteration (b) Type of linear equations
(c) Number of unknowns (d) Approximations to be done

25) In Gaussian elimination method, original equations are transformed by using _____
(a) Column operations (b) Row Operations (c) Mathematical Operations (d) Subset Operation

26) Solve the given system of equation by Gauss Elimination method.
3x + 4y – z = -6 -2y + 10z = -8 4y – 2z = -2
(a) (-2, -1, -1) (b) (-1, -2, -1) (c) (-1, -1, -2) (d) (-1, -1, -1)

27) Find the values of x, y, z in the following system of equations by gauss Elimination Method.
2x + y – 3z = -10 -2y + z = -2 z = 6
(a) 2, 4, 6 (b) 2, 7, 6 (c) 3, 4, 6 (d) 2, 4, 5

28) 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) for unequally intervals

29) Interpolation provides a mean for estimating functions
(a) At the beginning points (b) At the ending points (c) At the intermediate points (d) None of the mentioned

30) Interpolation is a method of
(a) Interrelating (b) Estimating (c) Integrating (d) Combining

31) The process of finding the values inside the interval ($X_0$, $X_n$) is called
(a) Interpolation (b) Extrapolation (c) Iterative (d) Polynomial equation

32) The Delta of power two is called the ____order difference operator.
(a) First (b) Second (c) Third (d) Fourth

33) Newton divided interpolation formula is used for intervals.
(a) Open (b) Unequal (c) Equal (d) Closed

34) How many types of methods are there to solve simultaneous algebraic equations?
(a) 2 (b) 3 (c) 4 (d) 5

35) The two initial guesses are required for the root which bracket the root(s). If one root of a real and continuous function f(x) = 0 , is bounded by values a and b then,
(a) f(a)*f(b)>0 (b) f(a)*f(b)<0 (c) f(a)*f(b)>1 (d) f(a)*f(b)<1

36) Accuracy refers to how closely a calculated value agrees with _____
(a) Each other (b) Same value (c) True value (d) No other value

37) The alternate name for the false position method is _____.
(a) Method of chord (b) Method of tangents (c) Regula falsi method (d) Method of Bisection

38) The Bisection method is also known as _____.
(a) Binary chopping (b) Quaternary chopping (c) Tri region chopping (d) Hex region chopping

39) The Newton Raphson method is also called as _____
(a) Tangent method (b) Secant method (c) Chord method (d) Diameter method

40) Secant method is slower than Newton Raphson method.
(a) True (b) False

41) Which of the following is an Open end method?
(a) Newton Raphson Method (b) Secant Method (c) Successive Approximation Method (d) All of the above

42) Successive approximation method is also known as _____
(a) Fixed point iteration method (b) Iteration method (c) Direct substitution method All of the above

43) While expressing f(x) = 0 to X = g(x), we can many different forms in successive approximation method. For convergence, which criteria must be satisfied?
(a) | g'(x) | > 1 (b) | g'(x) | <0 (c) | g'(x) | < 1 (d) | g'(x) | > 0

44) Which of the following method generally converges the solution?
(a) Hit and trial method (b) Approximation method (c) Iterative method (d) Direct method

45) Open end methods differ from Bracketing methods, in that Open end methods require only a single starting value or two starting values that do not necessarily bracket a root.
(a) True (b) False

46) Open end method may diverge as the computation progresses, but when they do converge, they usually do so than bracketing methods.
(a) Much slower (b) Much faster (c) May be slower or faster (d) May be much slower or much faster

47) Interpolation is the technique of determining the values of the functions for when the values of two points are given. (b)
(a) Outside the given points (b) Any inside or outside points
(c) Any intermediate point (d) None of the above

48) The Elimination process in Gauss Elimination method is also known as _____.
(a) Forward Elimination (b) Backward Elimination (c) Sideways Elimination (d) Crossways Elimination

49) What is the limitation of Gauss-seidal method?
(a) It cannot be used for the matrices with non-zero diagonal elements
(b) It is more complex than Jacobi's method
(c) It doesn't guarantees convergence for each and every matrix
(d) It is an iterative technique

50) When the linear system is called ill conditioned?
(a) If small changes in the coefficients of equations result in large changes in the values of the unknowns
(b) If reduction is done in the problem
(c) If the programming of linear system is expensive
(d) If small changes in the coefficients of equations result in small changes in the values of the unknowns