I. Multiple choice questions.   **10 X ½ = 5 Marks**

1. The bisection method is used to find:
   A) Maximum value   B) Minimum value   C) Root of a nonlinear equation   D) Area under a curve

2. For bisection method, the initial interval [a b] must satisfy:
   A) $f(a) = f(b)$ B) $f(a) + f(b) = 0$ C) $f(a) \cdot f(b) < 0$ D) $f(a) \cdot f(b) > 0$

3. After each iteration, the interval length becomes:
   A) Same   B) Double   C) One-third   D) Half

4. The rate of convergence of the bisection method is:
   A) Linear   B) Quadratic   C) Cubic   D) Exponential

5. The bisection method is used to find:
   A) Maximum value   B) Minimum value   C) Root of a nonlinear equation   D) Area under a curve

6. Regular-Falsi method is also called:
   A) Bisection method   B) Secant method   C) False Position method   D) Newton–Raphson method

7. Compared to the bisection method, Regular-Falsi method converges:
   A) Slower   B) Faster   C) At the same speed   D) Does not converge

8. Regular-Falsi method always:
   A) Fails   B) Diverges   C) Converges to a root   D) Finds exact root in one step

9. The iteration method is also called:
   A) Newton–Raphson method   B) Bisection method
   C) Fixed-point iteration method   D) Secant method

10. The initial value used in iteration method is called:
    A) Root B) Midpoint   C) Initial guess D) Interval

11. Compared to bisection method, Newton–Raphson is:
    A) Slower   B) Less accurate   C) Faster   D) Unstable

12. Newton–Raphson method fails when:
    A) $f(x)=0$ B) $f^1(x)=0$ C) Function is continuous   D) Root is real

13. Newton–Raphson method is based on:
    A) Linear interpolation   B) Taylor series
    C) Finite difference   D) Numerical integration

14. One disadvantage of Newton–Raphson method is:
    A) Slow convergence   B) Needs derivative
    C) Always diverges   D) Less accurate

15. Which interpolation method uses divided differences?
    A) Newton forward   B) Newton backward C) Lagrange   D) Newton divided difference

16. Which table is used in Newton's forward interpolation?
    A) Divided difference table   B) Central difference table
    C) Forward difference table   D) Backward difference table

17. Lagrange's interpolation formula is used when:
    A) Data is equally spaced   B) Data is unequally spaced
    C) Data is near beginning only   D) Data is near end only

II. Fill in the Blanks.   10 X ½ = 5 Marks

1. Interpolation is the technique of estimating the value of a function for any _____
2. The second order backward difference is_____
3. δ denotes difference operator_____
4. $\Delta[f(x)]=$_____
5. The n' difference which is constant is_____
6. _____is useful for interpolation near the beginning of set of tabular values.
7. Newton's backward difference interpolation formula is used near the _____of tabular values
8. Bessel's formula is best suited for p lying between_____
9. If the set of data points are unequally spaced then _____ method is used.
10. If the values of x are equally spaced, then the method of_____ is used.
11. _____are used to fir the position of the decimal point
12. _____is the difference between the true value of quantity and its approximate value.
13. If f(x) is continuous between the interval $[a_n b_n]$ then its length is _____
14. The percentage error &, is defined by _____
15. The false position method is also known as the _____
16. Newton-Raphson process has a _____convergence
17. _____method is used to compute complex roots.
18. The functions F and G and their _____ are continuous in R.
19. The bisection method converges_____.
20. The zero-order approximation is_____.

III. Short Questions.   5 X 1 = 5 Marks

1. Define absolute error.
2. Define relative error.
3. Write the formula of regular false
4. Define Shift operator.
5. Define averaging operator.

IV. Assignment.   1 X 5 = 5 Marks