

## Exam Questions on the Finite Difference (Spring 2017)

1. Finite differences of various orders.
2. Divided differences of various orders.
3. Statement of the problem of interpolation.
4. Lagrange's interpolation formula for arbitrarily specified nodes.
5. Uniqueness of the Lagrange's interpolation formula.
6. Error estimate of Lagrange's interpolation formula.
7. Linear Lagrange's formula.
8. Parabolic Lagrange's formula.
9. Newton's interpolation formula for equidistant nodes.
10. Newton's forward interpolation formula for equally specified nodes.
11. Newton's backward interpolation formula.
12. Newton's interpolation formula for arbitrarily specified nodes.
13. Error in Newton's interpolation.
14. Gauss' first interpolation formula.
15. Gauss' second interpolation formula.
16. Stirling's interpolation formula.
17. Bessel's interpolation formula.
18. Formulas of approximate differentiation based on Newton's first interpolation formula.
19. Formulas of approximate differentiation based on Newton's second interpolation formula.
20. Inverse interpolation for the case of equally spaced points.
21. Inverse interpolation for the case of unequally spaced points.
22. Newton-Cotes formulas for numerical integration.
23. Special cases of Newton-Cotes formulas.
24. Simple rectangle formula for numerical integration.
25. Generalized rectangle formulas for numerical integrations.
26. Error in rectangle formula.
27. The trapezoid's rule.
28. Simple trapezoid formula for numerical integration.
29. The composite trapezoid rule for numerical integration.
30. Error in trapezoid formula.
31. Simple Simpson's formula for numerical integration.
32. The composite Simpson's formula for numerical integration.
33. Error in Simpson's formula.
34. LU factorization method for the system of linear algebraic equations.
35. The method of successive approximation for system of linear algebraic equations.
36. The method of iteration for system of linear algebraic equations.
37. The Seidel's method for system of linear algebraic equations.
38. The successive approximation method for numerical solution of non-linear algebraic equations.
39. Convergence conditions of simple iteration method for numerical solution of non-linear algebraic equations.
40. The secant method for numerical solution of non-linear algebraic equations.
41. The tangent method for numerical solution of non-linear algebraic equations.