## Mid & Final Term Papers

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Here are two sample papers, one for Mid-Term and one for Final-Term, with easy-level questions based

**Mid-Term Paper**

**Duration: 1 hour**

**Section A: Multiple Choice Questions (20 marks)**

1. What is the main source of error in floating-point arithmetic?
a) Rounding errors
b) Truncation errors
c) Overflow errors
d) Underflow errors

2. Which method is used to find the root of a nonlinear equation within a given interval?
a) Bisection method
b) Regula-falsi method
c) Fixed point iteration method
d) Newton-Raphson method

3. What is the formula used to find the divided difference in interpolation?
a) Lagrange interpolation
b) Newton's divided difference formula
c) Forward difference formula
d) Backward difference formula

4. What is the purpose of numerical differentiation?
a) To find the derivative of a function
b) To find the integral of a function
c) To find the root of a nonlinear equation
d) To find the solution of a system of linear equations

5. Which method is an indirect method for solving a system of linear equations?
a) Jacobi Method
b) Gauss-Seidel Method
c) Gaussian Elimination Method
d) LU Decomposition Method

**Section B: Short Answer Questions (40 marks)**

1. Explain the concept of floating-point arithmetic and its limitations. (10 marks)
2. Describe the bisection method for finding the root of a nonlinear equation. (10 marks)
3. Derive the formula for Lagrange interpolation. (10 marks)
4. State the forward difference formula for numerical differentiation. (5 marks)
5. Explain the difference between the rectangular rule and the trapezoidal rule for numerical integration. (

**Section C: Problem-Solving (40 marks)**

1. Find the root of the equation x^2 - 2x - 3 = 0 using the bisection method. (10 marks)
2. Interpolate the value of y at x = 2 using the data points (1, 2), (3, 4), and (4, 5) using Lagrange interpol

3. Find the derivative of the function f(x) = 2x^2 + 3x - 4 at x = 1 using the forward difference formula. (10
4. Evaluate the integral of the function f(x) = x^2 + 2x + 1 from x = 0 to x = 2 using the trapezoidal rule. (1

**Final-Term Paper**

**Duration: 2 hours**

**Section A: Multiple Choice Questions (30 marks)**

1. What is the main advantage of the Newton-Raphson method over other methods for solving nonlinear
a) It is faster
b) It is more accurate
c) It converges faster
d) It is simpler to implement

2. Which method is used to find the solution of a system of linear equations using an iterative approach?
a) Jacobi Method
b) Gauss-Seidel Method
c) Gaussian Elimination Method
d) LU Decomposition Method

3. What is the purpose of numerical integration?
a) To find the derivative of a function
b) To find the integral of a function
c) To find the root of a nonlinear equation
d) To find the solution of a system of linear equations

4. Which method is used to find the value of a function at a given point using a set of data points?
a) Lagrange interpolation
b) Newton's divided difference formula
c) Forward difference formula
d) Backward difference formula

5. What is the main difference between the secant method and the Newton-Raphson method?
a) The secant method uses a linear approximation, while the Newton-Raphson method uses a quadratic
b) The secant method uses a quadratic approximation, while the Newton-Raphson method uses a linear
c) The secant method is more accurate, while the Newton-Raphson method is faster
d) The secant method is faster, while the Newton-Raphson method is more accurate

**Section B: Short Answer Questions (50 marks)**

1. Derive the formula for the Newton-Raphson method. (15 marks)
2. Explain the concept of numerical integration and its applications. (15 marks)
3. Describe the Jacobi Method for solving a system of linear equations. (10 marks)
4. State the formula for Simpson's 1/3 rule for numerical integration. (5 marks)
5. Explain the difference between the forward, backward, and central difference formulae for numerical di

**Section C: Problem-Solving (70 marks)**

1. Find the root of the equation x^3 - 2x - 5 = 0 using the Newton-Raphson method. (20 marks)
2. Evaluate the integral of the function f(x) = x^3 + 2x^2 + x + 1 from x = 0 to x = 3 using Simpson's 1/3 ru
3. Solve the system of linear equations 2x + 3y = 7, x - 2y = -3 using the Jacobi Method. (15 marks)
4. Find the derivative of the function f(x) = x^2 sin(x) at x = π/2 using the central difference formula. (15 m

Note: The mark distribution for each question can be adjusted according to the instructor's discretion.