

Dr. Babasaheb Ambedkar Open University
Term End Examination January – 2026

Course	: BSCIT	Date	: 23/02/2026
Subject Code	: BSCIT-403	Time	: 03:00pm to 05:15pm
Subject Name	: Computer Oriented Numerical Methods	Duration	: 02.15 Hours
		Max. Marks	: 70

Section A

Answer the following (Attempt any three)

(30)

1. Discuss in detail the arithmetic operations on floating-point numbers with suitable examples.
2. Explain the any on iterative method for solving non-linear equations with a suitable example.
3. Explain different types of matrices and matrix operations.
4. Explain the method of least squares and derive the normal equations for fitting a straight line.
5. Explain numerical differentiation using forward and backward difference formulas with examples.

Section B

Answer the following (Attempt any four)

(20)

1. Distinguish between absolute error and relative error with examples.
2. Write a short note on transpose of a matrix.
3. Define determinant of a matrix. Explain properties of determinants
4. Write a short note on Lagrange's interpolation formula.
5. Write a short note on Simpson's 3/8 Rule.
6. Write a short note on reduction of higher order differential equations into first order equations.

Section C

Part – A (Multiple Choice Questions)

(10)

- 1 A floating-point number consists of
 - A Sign, integer, base
 - C Mantissa, base, digit
 - B Sign, mantissa, exponent
 - D Exponent, digit, integer
- 2 Absolute error is defined as
 - A Ratio of error to true value
 - C Percentage of error
 - B Square of error
 - D Difference between true and approximate value
- 3 Which method guarantees convergence if the function is continuous?
 - A Secant method
 - C Bisection method
 - B Newton–Raphson method
 - D False position method
- 4 A matrix having equal number of rows and columns is called
 - A Square matrix
 - C Diagonal matrix
 - B Rectangular matrix
 - D Null matrix
- 5 If the determinant of a matrix is zero, then the matrix is
 - A Orthogonal
 - C Singular
 - B Invertible
 - D Identity
- 6 Gauss elimination method converts the system into
 - A Diagonal form
 - C Lower triangular form
 - B Upper triangular form
 - D Identity form
- 7 Interpolation is used to
 - A Find value within the given data
 - C Reduce data size
 - B Find value outside the given range
 - D Solve equations

- 8 Spline interpolation provides
A Discontinuous curve B Linear approximation only
C Random fitting D Piecewise smooth curve
- 9 Curve fitting aims to
A Pass exactly through all points B Approximate data points
C Find exact roots D Reduce table size
- 10 Forward difference formula is preferred when
A x is near the end B Data is random
C x is near the beginning D Intervals are unequal

Part – B (Do as Directed)

(10)

State whether the following statements are true or false

- 1 In normalized floating-point form, zero can always be normalized.
- 2 Truncation error occurs due to omission of higher-order terms in computations.
- 3 Numerical methods are unnecessary when analytical solutions are difficult.
- 4 Euler's method is based on Taylor series expansion.
- 5 Trapezoidal rule approximates the area under a curve using straight-line segments.
- 6 Numerical differentiation formulas are derived from difference tables.
- 7 Interpolation and curve fitting have identical objectives.
- 8 Least square method minimizes the sum of squared deviations from observed data.
- 9 Spline interpolation avoids oscillations present in high-degree polynomial interpolation.
- 10 Gauss elimination method is classified as a direct method.

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