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G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.



UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., STATISTICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
VI	PART-III	CORE ELECTIVE	U21ST6E2A	NUMERICAL ANALYSIS

Date & Session: 29.04.2025/FN

Time: 3 hours

Maximum: 75 Marks

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer <u>ALL</u> Questions.
CO1	K1	1.	Numerical techniques more commonly involve _____ a) Elimination method b) Reduction method c) Iterative method d) Direct method
CO1	K2	2.	The Newton -Raphson method is also called as _____ a) Secant method b) Chord method c) Diameter method d) Tangent method
CO2	K1	3.	The Gauss Jordan method reduces a original matrix into a _____ a) Identity matrix b) Skew Hermitian matrix c) Non-symmetric matrix d) None of these.
CO2	K2	4.	Which of these statements is incorrect about iterative methods? a) Low computational cost b) Low computer storage c) not suitable for sparse matrices d) Needs initial guess
CO3	K1	5.	$1 + \Delta =$ _____ a) $E-1$ b) $1/E$ c) E d) ∇
CO3	K2	6.	If the data is equally spaced and interpolation is near the beginning of the data then _____ interpolation formula is used. a) Newton's backward difference b) Newton's divided difference c) Lagrange's d) Newton's forward difference
CO4	K1	7.	Interpolation is done by _____. a) Curve fitting b) Regression analysis c) Both (a) & (b) d) None of the mentioned
CO4	K2	8.	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
CO5	K1	9.	The trapezoidal formula can be applied only if _____ a) It composes prism and wedges b) It composes triangles and parallelograms c) It composes prism and parallelograms d) It composes triangles and wedges
CO5	K2	10.	Simpson's $(1/3)^{rd}$ rule is obtained by putting $n =$ _____ in general quadrature formula. a) 1 b) 2 c) 3 d) 4

Course Outcome	Bloom's K-level	Q. No.	<div>SECTION – B (5 X 5 = 25 Marks)</div> <div>Answer <u>ALL</u> Questions choosing either (a) or (b)</div>										
CO1	K3	11a.	Discuss the Iteration method. <div>(OR)</div>										
CO1	K3	11b.	Find the positive root of $x^3 - x = 1$ correct to four decimal places by bisection method.										
CO2	K3	12a.	Solve the system of equations by Gauss elimination method. <div>$x + 2y + z = 3,$ $2x + 3y + 3z = 10,$ $3x - y + 2z = 13.$</div> <div>(OR)</div>										
CO2	K3	12b.	Derive the Gauss-Siedel iteration method.										
CO3	K4	13a.	Prove that the operators $\Delta, \nabla, E, \delta, \mu$ and D are all linear operators. <div>(OR)</div>										
CO3	K4	13b.	Write the properties of the operator Δ .										
CO4	K4	14a.	Highlight the advantages of central difference interpolation formulae. <div>(OR)</div>										
CO4	K4	14b.	Using Lagrange's interpolation formula, find $y(10)$ from the following table. <div><table><tr><td>x</td><td>5</td><td>6</td><td>9</td><td>11</td></tr><tr><td>Y</td><td>12</td><td>13</td><td>14</td><td>16</td></tr></table></div>	x	5	6	9	11	Y	12	13	14	16
x	5	6	9	11									
Y	12	13	14	16									
CO5	K5	15a.	Explain maxima and minima of a Tabulated function. <div>(OR)</div>										
CO5	K5	15b.	Explain Simpson's one-third rule.										

Course Outcome	Bloom's K-level	Q. No.	SECTION – C (5 X 8 = 40 Marks) Answer ALL Questions choosing either (a) or (b)							
CO1	K3	16a.	Solve the equation $x^3 + x^2 - 1 = 0$ for the positive root by Iteration method.							
CO1	K3	16b.	(OR) Find the positive root of $f(x) = 2x^3 - 3x - 6 = 0$ by Newton -Raphson method correct to five decimal places.							
CO2	K4	17a.	Solve the system using Gauss elimination method. $2x + 3y - z = 5$ $4x + 4y - 3z = 3$ $2x - 3y + 2z = 2$							
CO2	K4	17b.	(OR) Solve the following equation using Gauss Jacobi iteration method. $30x - 2y + 3z = 75$ $x + 17y - 2z = 48$ $x + y + 9z = 15$							
CO3	K4	18a.	Discuss the various differences operators and its properties.							
CO3	K4	18b.	(OR) State the fundamental theorem for finite differences and its applications.							
CO4	K5	19a.	Derive the Newton's forward interpolation formula.							
CO4	K5	19b.	(OR) Derive the Gauss's forward formula for interpolation.							
CO5	K5	20a.	Find the first two derivatives of $(x)^{1/3}$ at $x = 50$ and $x = 56$ given the table below (using Newton's forward and backward difference formula).							
			X	50	51	52	53	54	55	56
			$y = (x)^{1/3}$	3.6840	3.7084	3.7325	3.756	3.7798	3.8030	3.8259
CO5	K5	20b.	(OR) Derive the Simpson's three-eight rule.							

