

G 1054

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Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2014**

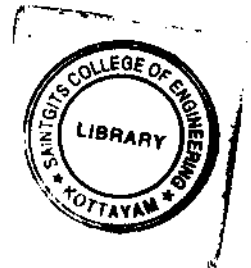
**Eighth Semester**

Branch : Civil Engineering

CE 010 805 G05 – NUMERICAL METHODS (Elective IV) [CE]

(New Scheme–2010 Admissions)

[Regular]



Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Explain Cholesky method.
2. Briefly describe Jacobi's method.
3. Explain isoparametric style of interpolation.
4. Describe weighted residual method.
5. Explain the method of least squares.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Explain Gaussian elimination.
7. What is meant by Eigenvalue problem? Explain eigenvalues and eigenvectors.
8. Explain trapezoidal rule and Gaussian quadrature formula.
9. Explain finite difference method.
10. What do you mean by frequency chart?

(5 × 5 = 25 marks)

**Part C**

*Answer all questions.*

*Each full question carries 12 marks.*

11. Use Gauss elimination method to solve  $10x - 7y + 3z + 5u = 6$ ,  $-6x + 8y - z - 4u = 5$ ,  $3x + y + 4z + 11u = 2$  and  $5x - 9y - 2z + 4u = 7$ .

Or

**Turn over**

12. Discuss the advantages of submatrix equation solver.

13. Find the eigenvalues and eigenvectors of the matrix  $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ .

Or

14. Using Jacobi's method, find the eigenvalues and eigen vectors of the matrix :

$$\begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$$

15. Evaluate  $\int_0^8 \frac{dx}{1+x^2}$  by using (i) Trapezoidal rule and (ii) Simpson's  $\frac{3}{8}$  rule.

Or

16. Use Simpson's  $\frac{1}{3}$ rd rule to find  $\int_0^{0.8} e^{-x^2} dx$  by taking seven ordinates.

17. Find Newton's forward difference interpolating polynomial for the following data :

$x$	0.1	0.2	0.3	0.4	0.5
$y = f(x)$	1.4	1.56	1.76	2	2.28

Or

18. Obtain a cubic backward interpolation polynomial for the table of points given. Find the value of  $y$  at  $x = 2.2$  :

X	1	2	3	4	5	6	7	8
Y	2.105	2.808	3.614	4.604	5.857	7.451	9.467	11.958

19. Obtain the Coefficient of correlation from the following data :

$x$	104	111	104	114	118	117	105	108	106	100	104	105
$y$	57	55	47	45	45	50	64	63	66	62	62	61

Or

20. The voltage  $v$  across a capacitor at time  $t$  seconds is given by the following table. Use the method of least squares to fit a curve of the form  $v = ae^{kt}$  to this data :

$t$	0	2	4	6	8
$v$	150	63	28	12	5.6

(5 × 12 = 60 marks)

