

G 1757

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Eighth Semester

Branch : Civil Engineering

CE 010 805 G05—NUMERICAL METHODS (Elective IV) (CE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

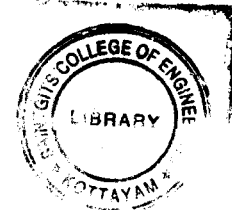
Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Discuss the nature of solutions of linear equations.
2. What is the significance of Eigen values ?
3. Write a note on interpolation.
4. Where the finite differences are used?
5. Write a note on linear regression.



(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Explain the advantages of Gaussian Elimination method.
7. Write a note on forward iteration method.
8. Find $f(1.7)$ if $f(1) = 2$, $f(1.5) = 2.5$ and $f(2) = 3.2$ using Hermitian interpolation.
9. Explain weighted residual method.
10. Explain curve fitting by sum of exponential.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each question carries 12 marks.

11. Solve the following equations using Gaussian elimination :

$$3x_1 + 4x_2 + 5x_3 + 2x_4 = 15$$

$$4x_1 + 3x_2 - x_3 + 5x_4 = 7$$

$$x_1 + 5x_2 - 3x_3 + 2x_4 = 6$$

$$3x_1 + 2x_2 + 6x_3 - 4x_4 = 5$$

Or

12. Solve the following equations using Cholesky method :

$$4x_1 + 3x_2 - 5x_3 = 19$$

$$9x_1 + 5x_2 + 6x_3 = 14$$

$$3x_1 - 4x_2 - 2x_3 = -4.$$

13. Find the Eigen values and vectors of the following matrix :

$$A = \begin{bmatrix} 3 & 0 & 2 \\ 0 & 4 & 0 \\ 2 & 0 & 1 \end{bmatrix}$$

Or

14. Determine the largest eigen value and corresponding eigen vector of the matrix :

$$\begin{bmatrix} 3 & 0 & 2 \\ 0 & 5 & 6 \\ 4 & 3 & 8 \end{bmatrix}$$

15. Using Trapezoidal rule find $\int_0^{2\pi} \cos x \, dx$. Use 9 ordinates.

Or



16. Evaluate the following integral using Simpsons 3/8 rule :

$$\int_{-3}^3 \frac{dx}{1+x^2}$$

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

x	:	0.2	0.4	0.6	0.8	1.0	1.2
$y = f(x)$:	2	3	5	8	10	13

Or

18. Obtain a backward interpolation polynomial and find $f(0.95)$:

x	:	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7
$y = f(x)$:	1.5	1.75	2.05	2.54	3.12	3.63	4.21	4.7

19. Using least square method fit a quadratic equation for the following data :

x	:	2001	2002	2003	2004	2005	2006
$y = f(x)$:	12	18	25	32	38	45

Or

20. Calculate the correlation coefficient of X and Y from the following data :

x	:	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
$y = f(x)$:	200	225	240	215	210	170	270	225	200	195

(5 × 12 = 60 marks)

