

16U214

(Pages: 2)

Name:

Reg. No.

SECOND SEMESTER B.C.A DEGREE EXAMINATION, MAY-2017

(Regular/Supplementary/Improvement)

(CUCBCSS - UG)

CC15SUBCA 2C 04 – NUMERICAL METHODS IN C

(Complementary Course)

(2015 Admission Onwards)

Time : Three hours

Maximum : 80 Marks

Part A

Answer all questions.

1. What is round off error?
2. State intermediate value theorem.
3. What is an 1) Eigen value 2) Eigen vector.
4. Write the following as a matrix equation $x = 9, y + z = 7, 3y = 2$.
5. What is a lower triangular matrix? Give example.
6. What is a backward difference operator?
7. Write the Linear Newton interpolating polynomial.
8. Find $\Delta^4 y_0$.
9. Define Trapezoidal rule of numerical integration.
10. Define linear and non-linear ordinary differential equation. **(10x1=10 marks)**

Part B

Answer all five questions.

11. Find the sum of 0.123×10^3 and 0.456×10^2 and write the result in three digit mantissa form.
12. Explain the bisection method.
13. What is an augmented matrix?
14. Given $f(0) = 1, f(1) = 2$ find the linear interpolating polynomial using Lagrange interpolation.

15. Find the characteristic equation of $\begin{bmatrix} 3 & 1 & 2 \\ 4 & 2 & 2 \\ 1 & 3 & 1 \end{bmatrix}$. **(5x2=10 marks)**

Part C

Answer any five questions.

16. Approximate the value of $17^{1/3}$ in iterations with initial approximation $x_0 = 2$.
17. Solve the system of equations $x + y + z = 6, 3x + y + 4z = 20, 2x + y + 3z = 13$ using Gauss elimination method

18. Show that $\mu = (1 + \frac{\delta^2}{4})^{1/2}$.

19. Using the Lagrange interpolation method find $f(3)$.

x	-1	2	4	5
$f(x)$	-5	13	255	625

20. Estimate $f(-0.5)$ and $f(0.5)$ using Hermite interpolation.

x	$f(x)$	$f'(x)$
-1	1	-5
0	1	1
1	3	7

21. Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Simpson's method.

22. Explain the Taylor series method for solving initial value problem.

23. Solve $x + 2y = 5, 3x - y = 1$ using Cramer's rule. **(5x4=20 marks)**

Part D

Answer any five questions

24. Explain 1) the method of false position, 2) increment search method.

25. Solve $x + 2y - z = 2, 3x + y + z = 1, 3x + 3y + 2z = 3$ by determining the inverse of the co-efficient matrix.

26. Solve $\begin{bmatrix} 2 & 2 & 1 \\ 4 & 2 & 3 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ Using Gauss- Jordan method.

27. Solve $x + y - z = 2, 2x + 3y + 5z = -3, 3x + 2y - 3z = 6$ Using LU decomposition method.

28. Using Romberg integration evaluate $\int_{\pi/4}^{\pi/2} \frac{\cos x \ln(\sin x)}{\sin^2 x + 1} dx$

29. Find the least square approximation of second degree for the following data

x	-2	-1	0	1	2
$F(x)$	15	1	1	3	19

30. Solve the initial value problem using Euler method $y' = t/y, y(0) = 1, h = 0.1$.

31. Solve $u' = 2tu^2, u(0) = 1$ with $h = 0.2$ in $[0, 0.4]$ using the fourth order classical Runge-Kutta method. **(5x8=40 marks)**