

**ANNA UNIVERSITY COIMBATORE**  
**B. E/ B. TECH. DEGREE EXAMINATIONS: MAY/ JUNE 2011**  
**REGULATIONS: 2008**  
**THIRD SEMESTER: CIVIL / EEE/ AERO**  
**080280026- NUMERICAL METHODS**

**Time: 3 Hours**

**Max. Marks: 100**

**PART - A**  
**(20X2=40MARKS)**  
**ANSWER ALL QUESTIONS**

1. Find iterative formula for  $1/N$  where  $N$  is a positive integer, by Newton's method.
2. By Gauss Jordan method, solve  $x+y=2$ ,  $2x+3y=5$ .
3. Compare Gauss Elimination and Gauss Siedel methods
4. Find the dominant Eigen value of  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$  by power method
5. State the Lagrange's interpolation formula.
6. Write the divide difference table for the following data  

X	2	5	10
y	5	29	109
7. What do you mean by interpolation?
8. What is the advantage of Lagrange's formula over Newton's formula.
9. Write the formula for  $dy/dx$  at  $x=x_0$  using Newton forward difference
10. What the errors in Trapezoidal and Simpson's rule.
11. When the simpson rule give the exact result
12. Write the formula for trapezoidal rule double integration.
13. State the disadvantage for Taylor's series method.
14. By eulers method find the  $y(1.1)$  given  $y'=x+y$ ,  $y(0)=0$

- 15. Compare Taylor series and Runge-Kutta method
- 16. Write down the Adams predictor and corrector formula
- 17. Write down the standard five point formula used in solving Laplace equation  $U_{xx} + U_{yy} = 0$  at the point
- 18. What is the value of  $k$  used to solve  $\frac{\partial u}{\partial t} = 0.5 \frac{\partial^2 u}{\partial x^2}$  by Bender-Schmidt method with  $h=1$  if  $h$  and  $k$  are the increments of  $x$  and  $t$  respectively?
- 19. Derive Crank-Nicolson scheme.
- 20. State Bender-Schmidt's equations

PART B

ANSWER ANY FIVE QUESTIONS

5x12=60 MARKS

21.a) Find real positive root for  $3x - \cos x - 1 = 0$  by Newton's method

[b] solve  $2x + 3y - z = 5$ ,  $4x + 4y - 3z = 3$ ,  $2x - 3y + 2z = 2$  by Gauss elimination method

22.a) Solve the system of equations using Gauss-Seidel iterative methods.

$$28x + 4y - z = 32, \quad x + 3y + 10z = 24, \quad 2x + 17y + 4z = 35.$$

(b) using Jacobi method find the eigen value of  $\begin{bmatrix} 1 & 3 & 4 \\ 3 & 1 & 3 \\ 4 & 3 & 1 \end{bmatrix}$

23. The table gives the distance in nautical miles of the visible horizon for the given heights in feet above the earth surface

X=height	100	150	200	250	300	350	400
Y=distance	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the values of  $y$  when  $x=218$ ,  $x=410$

24. the sales of the certain town is given below find the rate of sales in 1931

Year	1931	1941	1951	1961	1971
Sales in thousands	40.02	60.08	79.95	103.56	132.65

Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  using simpson 1/3 rule

25. evaluate  $\int_1^{1.4} \int_2^{2.4} 1/xy$  by simpson rule and verify by actual integration

26. a. Using modified Euler's method, find  $y(0.25)$  if  $\frac{dy}{dx} = 2xy$ ,  $y(0) = 1$ .

b. compute  $y(0.1)$  given  $y' = -y$ ,  $y(0) = 1$  by RK method

27. given  $y' = 1 - y$ ,  $y(0) = 0$  find

(i)  $y(0.1)$  &  $y(0.2)$  by euler method

(ii)  $y(0.3)$  by modified euler method

(iii)  $y(0.4)$  by milne's method

28. Solve  $u_{xx} + u_{yy} = 0$  over the square mesh of side 4 units, satisfying the following

conditions .

$$u(x,0) = 3x \quad \text{for } 0 \leq x \leq 4$$

$$u(x, 4) = x^2 \quad \text{for } 0 \leq x \leq 4$$

$$u(0,y) = 0, \quad \text{for } 0 \leq y \leq 4$$

$$u(4,y) = 12+y \quad \text{for } 0 \leq y \leq 4$$

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