

10. The no.of conditions required to solve the Laplace equation is

- A) 3 B)2 C)5 D)4

PART B (10 × 2 = 20 Marks)

11. What is the criterion for the convergence in Newton Raphson method?

12. State the principle used in Gauss Jordan method.

13. Find the divided difference table for the following data

x:	2	5	10
y:	5	29	109

14. State Newton's backward difference interpolation formula.

15. What is the order of error in Trapezoidal formula?

16. Why Simpson's one third rule is called a closed formula?

17. Is Euler's method a particular case of second order Runge – Kutta method?

18. What do we mean by saying that a method is self starting? Not self starting?

19. Classify the PDE $f_x - f_{yy} = 0$?

20. State the five point formula to solve the Poisson equation $u_{xx} + u_{yy} = 100$.

PART C (5 × 14 = 70 Marks)

21. a) i) Find a root of $x \log_{10} x - 1.2 = 0$ by Newton-Raphson method correct to three decimal places.

ii) Solve the given system of equations by using Gauss – Seidal iteration method.

$$20x + y - 2z = 17$$

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

(OR)

b) i) Find the positive root of $x^3 - 2x - 5 = 0$ by Regula Falsi method.

ii) Solve the given system of equations by Gauss Jordan method

$$x + 3y + 3z = 16$$

$$x + 4y + 3z = 18$$

$$x + 3y + 4z = 19$$

22. a) i) Using Newton's formula, find the polynomial $f(x)$ satisfying the following data. Hence evaluate y at $x = 5$.

x:	4	6	8	10
y:	1	3	8	10

ii) For the given values evaluate $f(9)$ using Lagrange's formula.

x:	5	7	11	13	17
f(x):	150	392	1452	2366	5202

(OR)

b) i) From the data given below, find the no of students whose weight is between 60 to 70.

Weight is lbs :	0 – 40	40 – 60	60 – 80	80 – 100	100-120
No of students:	250	120	100	70	50

(ii) Find $f(x)$ as a polynomial in x for the following data by Newton's divided difference formula.

x :	-4	-1	0	2	5
f(x):	1245	33	5	9	1335

23. a) i) The following data gives the velocity of a particle for 20 seconds at an interval of 5 seconds. Find the initial acceleration using the entire data.

Time (sec) :	0	5	10	15	20
Velocity(m/sec):	0	3	14	69	228

ii) Evaluate $\int_0^1 \int_0^2 \frac{2xy}{(1+x^2)(1+y^2)} dx dy$ by Trapezoidal rule with $h = k = 0.25$

(OR)

23 b) i) Given the following data, find $y'(6)$ & $y'(5)$ and the maximum value of y .

x :	0	2	3	4	7	9
y :	4	26	58	112	466	922

ii) Using Simpson's one third rule evaluate $\int_0^1 xe^x dx$ taking 4 intervals.

24. a) i) By Taylor's series method find $y(0.1)$ given that $y'' = y + xy'$, $y(0) = 1$ and $y'(0) = 0$.

ii) Using Milne's method find $y(4.4)$ given $5x y' + y^2 - 2 = 0$ given

$$y(4) = 1, y(4.1) = 1.0049, y(4.2) = 1.0097 \text{ and } y(4.3) = 1.0143.$$

(OR)

b) Apply fourth order R-K Method to determine $y(0.2)$ with $h = 0.1$ from $y' = x^2 + y^2$ given $y(0) = 1$.

25. a) Solve by Crank-Nicholson method the equation $u_{xx} = u_t$ subject to $u(x,0) = 0$,

$$u(0,t) = 0 \text{ and } u(1,t) = t, \text{ for two time steps.}$$

(OR)

b) Solve $y_{tt} = y_{xx}$ upto $t = 0.5$ with a spacing of 0.1 subject to $y(0,t) = 0$, $y(1,t) = 0$,

$$y_t(x,0) = 0, \text{ and } y(x,0) = 10 + x(1-x).$$
