Numerical analysis and statistics

UNIT 1

SECTION A

1. What is transcendental equation? Give and example
2. Define diagonal system.
3. Define Algebraic equation.
4. What is the Direct Method?
5. Define Polynomial equation.
6. Define Algebraic equation.
7. Define Transcendental equation.
8. Define polynomial equation.
9. Define Bisection method

SECTION B

1. Find the real root of $x^3 - 3x + 1 = 0$ lying between 1 and 2 upto three decimal places by Newton Raphson method.
2. Solve the equations $x + y = 2$ and $2x + 3y = 5$ by Gauss elimination method
3. Find the real roots of $x^3 - 3x + 1 = 0$ lying between 1 and 2 up to three decimal places by Newton Raphson method.
4. Is the system of equations diagonally dominant? Is not make it diagonally dominant $4x + 2y + 13z = 19; 4x - 2y + z = 3$? 6. Solve $x^3 + 3x - 1 = 0$.
5. A function $y = f(x)$ is given by the following table find f (0.2) by its suitable formula

x	0	1	2	3	4	5	6
y=f (x)	176	185	194	203	212	220	229

6. Find the regular false method the root of the equation $x^2 - \log_{10}x - 12 = 2$

6. Solve Iteration method $x^3 + x - 1 = 0$

SECTION C

1. Find the positive root of $x - \cos x = 0$ by method.
2. Solve the following system of equation Gauss Seidal iteration method $10x + x + 10y - z = -22;\ -2x + 3y + 10z = 22.$
3. A function *y = f(x)* is given by the following table find f (0.2) by its suitable formula

4. x	5. 0	6. 1	7. 2	8. 3	9. 4	10. 5	11. 6
12. y = f (x)	13. 176	14. 185	15. 194	16. 203	17. 212	18. 220	19. 229

4. Use lagrange formula for y at x = 6 the following data

5. X	6. 3	7. 7	8. 9	9. 10
10. Y	11. 168	12. 12	13. 72	14. 63

UNIT II

SECTION A

1. Define Interpolation.
2. Write Newton's Backward Interpolation formula.
3. Solve the equation x + y =2,2x + 3y = 5 by gauss elimination method.
4. Solve the following equation by gauss Jordon method x + y =7, x – y = -1.

SECTION B

1.Use the method of finite difference to prove

1. $1^2 + 2^2 + ... + n^2 = \frac{n(n+1)(2n+1)}{6}$
2. If y(75)=246, y(80) =202, y(85) = 118, y(90) = 40 find y(79).
3. If $f(x) = \frac{x}{x^2 + 7x + 12}$ find $\nabla f(x)$ taking the interval of differencing as unity.
4. Use Lagrange's interpolation formula to find f(x) when x=0, given the following data

   a. X 5 6 9 11

   b. Y 12 13 14 16

5.The above table given the value of *f(x)* and equal value of *x* Simpson's 3/8 value $\int_0^l f(x)dx$

5. x	6. 0	7. 0.5	8. 1.0	9. 1.5	10. 2.0
11. y	12. 0.399	13. 0.352	14. 0.242	15. 0.129	16. 0.05

6.Solve the following system of equation using Gauss Elimination method.

i. $x + y + z = 9$
ii. $2x – 3y + 4z = 13$
iii. $3x + 4y + 5z = 40$

7. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Tropezodicl. Rule with h = 0.2 and hence find the value of π.

8. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezodiel rule with h = 0.1 and hence find the value of

9. X	10. 0	11. 0.2	12. 0.4	13. 0.6	14. 0.8	15. 1
16. Y	17. 1	18. 0.9615	19. 0.8621	20. 0.7353	21. 0.6098	22. 0.5000

9. Evaluate $\int_{-3}^{3} x^4 dx$ using trapezoidal and simpson's rule verify the following result by a actual integration

SECTION C

1.Evaluate $\int_0^1 \frac{dx}{1+x}$ using (a) Trapezoidal rule

2.Simpson's one third rule. Take $h = \frac{1}{6}$ for both cases.

3.Evaluate $\int_0^5 \frac{dx}{4x+5}$ by Trapezoidal rule coordinates. Find the regular false method the root of the equation $x^2 - \log_{10} x - 12 = 0$.

4.Gauss seidal method (or) Jocobi interation $27x + 6y - z = 85,\ 6x + 15y + 2z = 72$

$x + y + 54z = 110$.

5. Solve the following equation by Jacobi –Iteration Method

28x + 4y –z =32,

x + 3y + 10z = 24,

2x + 11y + 4z =35

6.Solve the following equation by Jacobi –Iteration Method

28x + 4y –z =32,

x + 3y + 10z = 24,

2x + 11y + 4z =35

UNIT III

SECTION A

1.What is boundary value problem

2.What is the draw back of Taylor series method?

3.Define Mutually exclusive events

4.What is boundary value problem?

5.Define R-K method of first order. .

6. Define Tailor's series.
7. Write Milne's predictor & Corrector method formulae.
8. Write Adaam's Bashforth predictor & Corrector method formulae
9. Define quartratic deviation.
10. To find the median value 2 ,4 , 6 , 8 ,10 , 12 ,14 ,16.

SECTION B

1.Find y(0.1) and y(0.2) given $\frac{dy}{dx} = y + xy^2 \quad y(0) - 1$ by Taylor's series method.

2.Find the value of y=0.1 by Picard's method given $\frac{dy}{dx} = \frac{y-x}{y+x}, y(0) = 1$

3.If $f(x) = \frac{x}{x^2 + 7x + 12}$ find $\nabla f(x)$ taking the interval of differencing as unity.

4.Use Lagrange's interpolation formula to find f(x) when x=0, given the following data

a. X 5 6 9 11
b. Y 12 13 14 16

5.Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezodiel rule with h = 0.1 and hence find the value of

2. X	3. 0	4. 0.2	5. 0.4	6. 0.6	7. 0.8	8. 1
9. Y	10. 1	11. 0.9615	12. 0.8621	13. 0.7353	14. 0.6098	15. 0.5000

6.Evaluate $\int_{-3}^{3} x^4 dx$ using trapezoidal and simpson's rule verify the following result by a actual integration

16. X	a. -3	17. -2	18. -1	19. 0	20. 1	21. 2	22. 3
23. y	24. 81	25. 16	26. 1	27. 0	28. 1	29. 16	30. 81

SECTION C

1. Compute y(0.1) and y(0.2) by Runge-Kutta method of 4^{th} order for the
2. differential equation $\frac{dy}{dx} = xy + y^2, y(0) = 1$
3. Define Probability.
4. A ball is drawn at random from a box containing 6 red balls, 4 white balls and 5 blue balls. Determine the probability of red ball.
5. Using fourth order Runge-kuta method, evaluate the value of y when $x = 1.1$ given that $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2}; y(1) = 1.$
6. Using ranga kutta second order solve y(0) = 1 find the values at x=0.2 and 0.4 Solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$.
7. Using Milne's predictor and corrector methods find y(0.4) the differential equation $\frac{dx}{dy}$=1+xy, y(0)=2.
8. Using picards method solve dy/dx =1+xy, y(0) = 2,find y(0.1),y(0.2),y(0.3).

UNIT IV

SECTION A

1. What is theoretical frequency distribution?
2. What is meant by positional average?
3. .Define point –wise solution.
4. Find the arithmetic mean for the following 3 , 24 , 6 ,48
5. Find the arithmetic mean for 3 , 24 , 6 , 48.
6. Define weight arithmetic mean.

SECTION B

1. A ball is drawn at random from containing 6 red balls, 4 white balls, blue balls, Determine the probalities is (i) Red (ii) White (iii) Blue.

2. A coin is tossed six time, What Probability of containing (i) 4 head
3. (ii) heads (iii) 6 haeds. (a) State and prove the multiplication of the probability.
4. Use Tailor's series method find Y . at X=1.1 and 1.2 by solving $\frac{dx}{dy}$= x^2+y^2
5. solve $\frac{dx}{dy}$=1-y, y(0) = 0 using euler's methods. Find y at x^1=0.1 and x^2=0.2.
6. Using Adaams Bash forth predictor methods find y(4.4),given $5xy^{'}+y^2=2$,y(4)=1, y (4.1) = 1.0049, y(4.2) = 1.0092, y (4.3) = 1.0143.
7. If the means of the following distribution is 15 find P.

X	8. 5	9. 10	10.15	11.20	12.25
Y	13.6	14.p	15.6	16.10	17.5

9.Calculate the following standard deviation 14 ,22 ,9 , 15 ,20 ,17 ,12 ,11.

10.Find the mean for the following data

18. X	19. 1	20. 3	21. 3	22. 4	23. 5	24. 6	25. 7
26. y	27. 5	28. 9	29. 12	30. 17	31. 14	32. 10	33. 6

11Find the standard deviaton

34. wages	35. No.of workers
36. Up to Rs 10	37. 12
38. Up to Rs 20	39. 18
40. Up to Rs 30	41. 35
42. Up to Rs	43. 42

40	
44. Up to Rs 50	45. 50
46. Up to Rs 60	47. 45
48. Up to Rs 70	49. 20
50. Up to Rs 80	51. 8

SECTION C

1. The probability that an evening college student will graduate is 0.4 Determine the probability that out of 5 students (a) none (b) one and (C) atleast one will graduate It a Poisson Distribution to the following data and calculate the theoretical frequencies;
2. It a Poisson Distribution to the following data and calculate the theoretical frequencies;

X	0	1	2	3	4
F	123	59	14	3	1

3. Using ranga kutta second order solve y(0) = 1 find the values at x=0.2 and 0.4 Solve $\frac{dy}{dx} = \frac{y^2-x^2}{y^2+x^2}$.
4. Using Milne's predictor and corrector methods find y(0.4) the differential equation $\frac{dx}{dy}$=1+xy, y(0)=2.
5. Find the correlation co efficient between size –group(x) and percentage of derivatives (y)

X	15.5	16.5	17.5	18.5	19.5.	20.5
Y	$\frac{150}{200}$	$\frac{160}{270}$	$\frac{170}{340}$	$\frac{180}{360}$	$\frac{180}{400}$	$\frac{120}{300}$

6. Using Adams bashforth method find y(4.4),given $5xy' + y^2 = 2$, y(4) = 1, y(4.1) =1.0049, y(4.2) =1.0092, sy(4.3) = 1.0143.

UNIT V

SECTION A

1. Define coefficient of Mean deviation
2. What is the Measure of central tendency?
3. Define Mean Deviation.
4. Define regression.
5. Define arithmetic mean.

SECTION B

1. From the following data calculation missing value when its mean is 115.

wages (Rs.)	110	112	113	117	?	125
No.of workers	25	17	13	15	14	08

2. Find the range and coefficient of weights of 7 students from the following 27,30,35,36,38,40,43
3. Give the relation between Binominal and Normal Distributions. (a) Compare between mean an deviation.
4. Calculate coefficient of correlation following data.

X	12	9	8	10	11	13	7
Y	14	8	6	9	11	12	3

SECTION C

1. Find out the coefficient of correlation in the following case:

Height of father (in inches)	65	66	67	67	68	69	71	73
Height of son (in inches)	67	68	64	68	72	70	69	70

2.Calculate the correlation co-efficient for the following highest of fathers and sons.

X	42	56	63	33	58	69	70	72
y	67	12	65	68	52	77	63	56

3.Properties Of correlation co efficient.

	8. 1-5	9. 2-3	10. 2-4	11. 3-4	12. 3-5	13. 3-6	14. 4-6	15. 5-6
	19. 12	20. 4	21. 10	22. 3	23. 5	24. 10	25. 7	26. 4

SECTION C

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Height of father (in inches)	65	66	67	67	68	69	71	73
Height of son (in inches)	67	68	64	68	72	70	69	70

Calculate the correlation co-efficient for the following highest of fathers and sons.

X	65	66	67	67	68	69	70	72
y	67	68	65	68	72	72	69	71

1. Properties Of correlation co efficient.