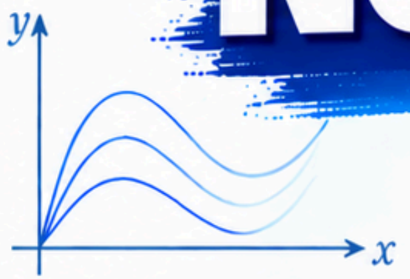
$\frac{dy}{dx} = f(x, y)$

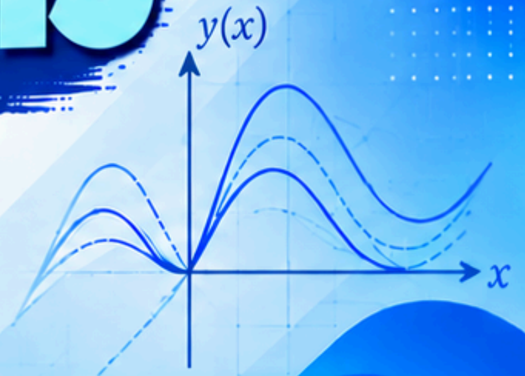
CSIR NET DEC 2026

NUMERICAL ANALYSIS

TO-DO LIST

$y'' + p(x)y' + q(x)y = 0$





- Exam Weightage
- YouTube Video Links
- Short Notes
- Previous Year Questions (PYQs)
- Practice Plan
- Important Formulas & Key Concepts

MATHSCARE
BY DR.GAJENDRA PUROHIT



Dr.Gajendra Purohit • BSc / BTech

@gajendrapurohit • 1.68M subscribers • 1.4K videos

300 Million+ Views ...more

play.google.com/store/apps/details?id=com.mathscare.app and 6 more links

Subscribe

Subscribe

1.8 m + Subs



Dr.Gajendra Purohit - GATE / IIT JAM / CSIR NET •

@gajendrapurohit GATE-NET-JAM • 412K subscribers • 1.9K videos

70 Million+ Views ...more

play.google.com/store/apps/details?id=com.mathscare.app and 5 more links

Subscribe

Subscribe

400K+ Subs



MathsCare TGT-PGT By Dr.Gajendra Purohit

@MathsCareTGT-PGTbyGPsir • 39.7K subscribers • 437 videos

1.5 Million+ Views | Learn Mathematics for Teaching Exams ...more

play.google.com/store/apps/details?id=com.mathscare.app and 5 more links

Subscribe

Subscribe

50k+ Subs



Engineering Career & Skills By Dr.Gajendra Purohit

@MathscareGATE • 1.34K subscribers • 30 videos

Welcome to MathsCare GATE for Engineers and Skills ...more

whatsapp.com/channel/0029Va52c3u5q08jHbUGLO3q and 9 more links

Subscribe

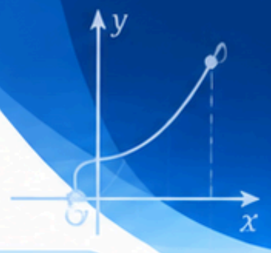
Subscribe

1.34k + Subs



$f(x) = 0$

Numerical Analysis



01	Numerical solutions of algebraic equations.
02	Method of iteration and Newton-Raphson method, Rate of convergence.
03	Solution of systems of linear algebraic equations using Gauss elimination and Gauss-Seidel methods.
04	Finite differences, Lagrange, Hermite and spline interpolation.
05	Numerical differentiation and integration.
06	Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods.

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix}$$

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$



MATHS CARE
BY DR GAJENDRA PUROHIT

Numerical Analysis

for CSIR-NET

Topics	YouTube Videos [Click on the LINK to watch the video]
Mathematical Preliminaries and Errors	WATCH NOW
Solution of Algebraic and Transcendental Equations	WATCH NOW
Interpolation and Approximation	WATCH NOW

Numerical Analysis

[redacted]

Topics	YouTube Videos [Click on the LINK to watch the video]
Ordinary Differential Equation - Initial Value Problems	WATCH NOW
System of Linear Algebraic Equations and Eigenvalue Problems	WATCH NOW
Differentiation and Integration	WATCH NOW

PREVIOUS YEARS WEIGHTAGE

ANALYSIS OF CSIR-NET / JRF PREVIOUS YEAR PAPER

SUBJECTS	DEC. 2019			SUBJECTS	26 NOV. 2020			SUBJECTS	30 NOV. 2020			SUBJECTS	16-Feb-22			SUBJECTS	Jun-23		
	JRF		LS		JRF		LS		JRF		LS		JRF		LS		JRF		LS
	MARKS				MARKS				MARKS				MARKS				MARKS		
SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL
UNIT - III	24	57	81	UNIT - III	24	57	81	UNIT - III	27	47.5	74.5	UNIT - III	24	52.25	76.25	UNIT - III	24	57	81
NUMERICAL ANALYSIS	3	9.5	12.5	NUMERICAL ANALYSIS	3	9.5	12.5	NUMERICAL ANALYSIS	6	9.5	15.5	NUMERICAL ANALYSIS	6	4.75	10.75	NUMERICAL ANALYSIS	3	9.5	12.5

SUBJECTS	Dec-23			SUBJECTS	Jun-24			SUBJECTS	Feb-25			SUBJECTS	Jul-25			SUBJECTS	Dec-25		
	JRF		LS		JRF		LS		JRF		LS		JRF		LS		JRF		LS
	MARKS				MARKS				MARKS				MARKS				MARKS		
SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL	SECTIONS	PART B	PART C	TOTAL
UNIT - III	27	47.5	74.5	UNIT - III	24	52.25	76.25	UNIT - III	24	52.25	76.25	UNIT - III	21	52.25	73.25	UNIT - III	2.21	47.5	68.5
NUMERICAL ANALYSIS	3	9.5	12.5	NUMERICAL ANALYSIS	6	9.5	15.5	NUMERICAL ANALYSIS	3	9.5	12.5	NUMERICAL ANALYSIS	3	9.5	12.5	NUMERICAL ANALYSIS	3	4.75	7.75

December 2025

Topics	Questions	Total Marks
Topology	3	12.85
Functional Analysis	1	4.75
Integral Equation	3	12.5
Markov Chain	2	7.75
COV (Calculus of Variations)	3	12.5
Numerical Analysis	3	12.5
Linear Programming Problems	1	3
Total	**16**	**65.85**

June 2025

Topics	Questions	Total Marks
Topology	2	7.75
Functional Analysis	1	4.75
Integral Equation	3	12.5
Markov Chain	1	4.75
Calculus of Variation	3	12.5
Numerical Analysis	3	12.5
Linear Programming Problem	1	3
Total	**14**	**57.75**

JULY-2026

14 QUESTIONS

TOPIC	NO. OF QUESTIONS	MARKS
Topology	3	12.5
Functional Analysis	1	4.75
Integral Equation	2	7.75
Marcov Chain	2	7.75
COV (Calculus of Variation)	1	4.75
Numerical Analysis	3	12.5
Linear Programming Problem	2	7.75
TOTAL	**14**	**57.75**

SHORT NOTES

Interpolation

Interpolation is the process of finding out the value of a function at any intermediate data point within the range of given data points.

Interpolation with equal interval

Newton's Forward Difference Formula : Let y = f(x) be a function that takes values y_0 , y_1 , y_2……y_n at the corresponding points x_0 , x_1 , x_2 , …x_n and each x_u are equi – distance i.e. $x_u = x_0 + uh$

$$f(a+hu)=f(a)+\frac{u}{1!}\Delta f(a)+\frac{u(u-1)}{2!}\Delta^2 f(a)+\frac{u(u-1)(u-2)}{3!}\Delta^3 f(a)+\ldots.,\text{where a} = x_0$$

Newton's Backward Interpolation Formula :

Let y = f(x) be a function that takes values y_0 , y_1 , y_2……y_n at the corresponding points x_0 , x_1 , x_2 , …x_n

$$f(a+hu)=f(a)+\frac{u}{1!}\nabla f(a)+\frac{u(u+1)}{2!}\nabla^2 f(a)+\frac{u(u+1)(u+2)}{3!}\nabla^3 f(a)+\ldots. ,\text{where a} = x_n$$

Sterling Interpolation formula :

$$f(a+hu)=y_0+\frac{u}{1!}\left[\frac{\Delta y_0+\Delta y_{-1}}{2}\right]+\frac{u^2}{2!}\Delta^2 y_{-1}+\frac{u(u^2-1)}{3!}\left[\frac{\Delta^2 y_{-1}+\Delta^3 y_{-2}}{2}\right]+\frac{u^2(u^2-1)}{4!}\Delta^4 y_{-2}+\ldots.$$

nterpolation with unequal interval

Dr. Gajendra Purohit

Divided Differences : If (x_0, y_0), (x_1, y_1), ... be given points, then first divided difference for x_0, x_1 is defined as $f[x_0,x_1]=\frac{y_1-y_0}{x_1-x_0}$.

$$\Rightarrow \qquad f[x_0,x_1]=\frac{f(x_1)-f(x_0)}{x_1-x_0}$$

Similarly, $f[x_1,x_2]=\frac{f(x_2)-f(x_1)}{x_2-x_1}$

The second divided difference for x_0, x_1, $x_2$is $f[x_0,x_1,x_2]=\frac{f(x_1,x_2)-f(x_0,x_1)}{x_2-x_0}$.

The third divided difference for x_0, x_1, x_2, x_3 is $f[x_0,x_1,x_2,x_3]=\frac{f(x_1,x_2,x_3)-f(x_0,x_1,x_2)}{x_3-x_0}$.

Newton's Divided difference formula : Let $y = f(x)$ be a function that takes values $y_0, y_1, y_2,\ldots,y_n$ at the corresponding points $x_0, x_1, x_2, \ldots x_n$ then

$f(x) = f(x_0) + (x - x_0)\, f[x_0, x_1] + (x - x_0)(x - x_1)\, f[x_0, x_1, x_2] + \ldots..$

Lagrange's Formula of Interpolation :

$$f(x)=\frac{(x-x_1)(x-x_2)....(x-x_n)}{(x_0-x_1)(x_0-x_2)....(x_0-x_n)}f(x_0)+\frac{(x-x_0)(x-x_2)....(x-x_n)}{(x_1-x_0)(x_1-x_2)....(x_1-x_n)}f(x_1)+....$$

$$.....+\frac{(x-x_0)(x-x_1).....(x-x_{n-1})}{(x_n-x_0)(x_n-x_1).....(x_n-x_{n-1})}f(x_n)$$

Numerical Solution of ODE

Picard's Method :

Let us consider first order differential equation $\frac{dy}{dx}=f(x,y); y(x_0)=y_0$ .....(i)

Then for n^{th} approximation y_n to solution of IVP is $y_n = y_0 + \int_{x_0}^{x} f(x, y_{n-1})dx$

Euler's Method :

Formula to find n^{th} approximation solution y_n of IVP $\frac{dy}{dx}=f(x,y), y(x_0)=y_0$ is $y_n = y_{n-1} + h\, f(x_{n-1}, y_{n-1})$, where $x_n = x_0 + nh$

Modified Euler's Method :

Formula for this method upto n^{th} approximation to solution of IVP is

$y_n=y_{n-1}+\frac{h}{2}[f(x_{n-1},y_{n-1})+f(x_n,\bar{y}_n)]$,where $\bar{y}_n$ is calculated by using Euler's method $\bar{y}_n=y_{n-1}+hf(x_{n-1},y_{n-1})$.

Numerical Integration :

The process of evaluating a definite integral from a set of tabulated values of f(x) is called numerical integration or quadrature. Let [a, b] be divided into n equal subintervals, s.t. $a = x_0 < x_1 < x_2 < \ldots.. < x_n = b$ where $x_n = x_0 + nh$

Dr. Gajendra Purohit

$$\int_a^b f(x)dx = \int_{x_0}^{x_0+nh} f(x)dx = \int_{x_0}^{x_0+nh} ydx$$

Trapezoidal Rule :

$$\int_{x_0}^{x_0+nh} ydx = \frac{h}{2}[(y_0+y_n)+2(y_1+y_2+.....+y_{n-1})] \text{ where } n\in N$$

Simpson's One-third Rule :

$$\int_{x_0}^{x_0+nh} ydx = \frac{h}{3}[(y_0+y_n)+4(y_1+y_3+.....+y_{n-1})+2(y_2+y_4+.....+y_{n-2})] \text{ ,where n is even.}$$

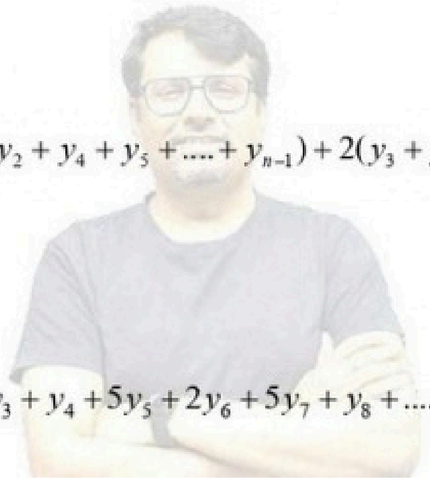
Simpson's Three Eight Rule :

$$\int_{x_0}^{x_0+nh} ydx = \frac{3h}{8}[(y_0+y_n)+3(y_1+y_2+y_4+y_5+....+y_{n-1})+2(y_3+y_6+...y_{n-3})]$$

where n is multiple of 3.

Weddle's Rule :

$$\int_{x_0}^{x_0+nh} ydx = \frac{3h}{10}(y_0+5y_1+y_2+6y_3+y_4+5y_5+2y_6+5y_7+y_8+.....) \text{ where n is multiple of 6.}$$



Runge – Kutta Method

(i) **First order R – K Method :** Euler's method is the R – K method of first order.

(ii) **Second order R – K Method :** Euler's modified method is the R – K method of second order.

Dr. Gajendra Purohit

(iii) **Third order R – K Method :**

$y_1 = y_0 + \frac{1}{6}(k_1+4k_2+k_3)$, where $k_1 = hf(x_0,y_0), k_2 = hf\left(x_0+\frac{h}{2}, y_0+\frac{k_1}{2}\right)$ and

$k_3 = hf(x_0+h, y_0+k')$ where $k' = hf(x_0+h, y_0+k_1)$

(iv) **Fourth order R – K Method :** This method is most commonly used and is generally called as Runge – Kutta method only.

In IVP, $\frac{dy}{dx} = f(x,y), y(x_0) = y_0$

Approximate value of y is given as $y_1 = y_0 + k$, where $k = \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$

where $k_1 = hf(x_0, y_0)$

$$k_2 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{k_1}{2}\right)$$

$$k_3 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{k_2}{2}\right) \qquad k_4 = hf(x_0 + h, y_0 + k_3)$$

Method for solving algebraic and transcendental equation

Regula – Falsi Method : In General $x_{n+1} = x_{n-1} - \frac{f(x_{n-1})(x_n - x_{n-1})}{f(x_n) - f(x_{n-1})}$

Newton RaphsonMethod :

In general, $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}; n = 0, 1, 2, 3, \ldots$

Iterative Method :

Let f(x) be a continuous function and let ξ be real root of equation f(x) = 0.

Let equation f(x) = 0 may put in form of $x = \phi(x)$ .... (1)

Let x_0 be initial approximation very close to ξ.

Put x_0 to RHS of (1) to obtain x_1 i.e. $x_1 = \phi(x_0)$ and then $x_2 = \phi(x_1)$ and so on.

In general, $x_{n+1} = \phi(x_n)$

Fixed point iteration :

The number p is fixed point for a given function g(x) if g(p) = p.

In short, if function g(x) has fixed point at p, then function defined by f(x) = x – g(x) has a zero at p.

Dr. Gajendra Purohit

-:Previous Year Questions :-

NOTE:- click on abovetextyoucanrefertolinkofvideosolution of questions

1. Let f(x) be the polynomial of degree atmost 2 that interpolates the data (-1, 2), (0, 1) and (1, 2). If g(x) is a polynomial of degree atmost 3 such that f(x) + g(x) interpolates the data (-1, 2), (0, 1), (1, 2) and (2, 17), then **(CSIR NET Feb 2025)**

(a) f(5) + g(3) = 50 (b) 2f(5) – g(3) = 4

(c) f(1) + g(3) = 50 (d) f(5) + g(3) = 74

2. If $\lambda \in R$ and $\rho \in R$ are such that the quadrature formula

$$\int_{x_0}^{x_0+h} f(x)dx \approx \lambda h(f(x_0)+f(x+h))+\rho h^3(f''(x_0)+f''(x_0+h))$$

is exact for all polynomials of degree as high as possible, then

(CSIR NET Feb 2025)

3. Let g(x) be the polynomial of degree atmost 4 that interpolates the data

(CSIR NET July 2024)

x	-1	0	2	3	6
y	-30	1	c	10	19

If g(4) = 5, then which of the following statements are true?

(a) c = 13 (b) g(5) = 6 (c) g(1) = 14 (d) c = 15

4. Let S denote the set of all 2 × 2 matrices A such that the iterative sequence generated by the Gauss-seidel method applied to the system of linear equations $A\begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$. Converges for every initial guess. Then which of the following statements are true?

(CSIR NET July 2024)

5. If the value of approximate solution of the initial value problem

$$\begin{cases} y'(x) = x(y(x)+1), x \in R \\ y(0) = \beta \end{cases}$$

at $x = 0.2$ using the forward Euler method with step size 0.1 is 1.02 then value of p is

(CSIR NET July 2024)

6. Consider the initial value problem $\frac{dy}{dx} = f(x,y), y(x_0) = y_0$, where f is a twice continuously differentiable function on a rectangle containing the point (x_0, y_0). With the step-size h, let the first iterate of a second order scheme to approximate the solution of the above initial value problem be given by $y_1 = y_0 + Pk_1 + Qk_2$. where $k_1 = hf(x_0, y_0)$, $k_2 = hf(x_0 + \alpha_0 h, y_0 + \beta_0 k_1)$ and $P, Q, \alpha_0, \beta_0 \in R$.
Which of the following statements are correct? **(CSIR NET Dec 2023)**

(a) If $\alpha_0 = 2$, then $\beta_0 = 2$, $P = \frac{3}{4}, Q = \frac{1}{4}$.
(b) If $\beta_0 = 3$, then $\alpha_0 = 3$, $P = \frac{5}{6}, Q = \frac{1}{6}$.
(c) If $\alpha_0 = 2$, then $\beta_0 = 2$, $P = \frac{1}{4}, Q = \frac{3}{4}$.
(d) If $\beta_0 = 3$, then $\alpha_0 = 2$, $P = \frac{1}{6}, Q = \frac{5}{6}$.

Q7. Consider the problem $y' = (1 - y^2)^{10} \cos y$, $y(0) = 0$
Let J be the maximal interval of existence and K be the range of the solution of th above problem. Then which of the following statements are true?
(CSIR NET Dec 2023)
(a) J = R (b) K = (-1, 1) (c) J = (-1, 1) (d) K = [-1, 1]

Q8. **Using Euler's** method with the step size 0.05, the approximate value of the solution for the initial value problem $\frac{dy}{dx} = \sqrt{3x+2y+1}, y(1) = 1$
at x = 1.1 (rounded off to two decimal places), is **(CSIR NET Dec 2023)**
(a) 1.50 (b) 1.65 (c) 1.25 (d) 1.15

9. The coefficient of x^3 in the interpolating polynomial for the data

X	0	1	2	3	4
Y	1	2	1	3	5

(a) -1/3 (b) -1/2 (c) 5/6 (d) 17/6

(CSIR NET Dec 2023)

10. Let f(x) is a polynomial of degree less than or equal to 2 s.t.

$$\int_{-1}^{1} f(x)dx = af(-1) + bf'(0) + cf'(1)$$

, then a + b + c **(CSIR NET Nov 2022)**

(a) 1 (b) 2 (c) 3 (d) 4

11. Let a, b, c $\in$ R be such that the quadrature rule, $\int_{-1}^{1} f(x)dx = af(-1) + bf(0) + cf'(1)$ is exact for all polynomials of degree less than or equal to 2. Then a + b + c equal to

CSIR NET FEB 2022

(a) 4 (b) 3 (c) 2 (d) 1

12. The values of a, b, c, d, e for which the function

$$f(x) = \begin{cases} a(x-1)^2 + b(x-2)^3 & -8 < x \le 2 \\ c(x-1)^2 + d & 2 \le x \le 3 \\ (x-1)^2 + e(x-3)^3 & 3 \le x < \infty \end{cases}$$ is a cubic spline are

Dr. Gajendra Purohit

CSIR NET FEB 2022

(a) a = c = 1, d = 0, b, e are arbitrary (b) a = b = c = 1, d = 0, e is arbitrary

(c) a = b = c = d = 1, e is arbitrary (d) a = b = c = d = e = 1

13. Let A be the following invertible matrix with real positive entries : $A=\begin{bmatrix}1 & 2\\ 8 & 9\end{bmatrix}$.

Let G be the associated Gauss-Siedel iteration matrix. What are the two eigenvalues of G?

CSIR NET SEP 2022

(a) 0 and 4/3 (b) 0 and -4/3 (c) 0 and 16/9 (d) 4/3 and -4/3

14. Consider ODE = x = f(t, x) in R, for a smooth function f. Consider a general second order Runge-Kutta formula of the form $x(t+h) = x(t) + w_1hf(t, x) + w_2hf(t+\alpha h, x+\beta hf) + 0(h^3)$. Which of the following choices of $(w_1, w_2, \alpha, \beta)$ are correct?

CSIR NET SEP 2022

(a) $\left(\frac{1}{2},\frac{1}{2},1,1\right)$ (b) $\left(\frac{1}{2},1,\frac{1}{2},1\right)$ (c) $\left(\frac{1}{4},\frac{3}{4},\frac{2}{3},\frac{2}{3}\right)$ (d) (0, 1, 1, 1)

15. Which of the following values of a, b, c and d will produce a quadrature formula $\int_{-1}^{1} f(x)dx \approx af(-1)+bf(1)+cf'(-1)|df'(1)$? **CSIR NET JUNE 2023**

(a) $a=1, b=1, c=\frac{1}{3}, d=-\frac{1}{3}$ (b) $a=-1, b=1, c=\frac{1}{3}, d=-\frac{1}{3}$

(c) $a=1, b=1, c=-\frac{1}{3}, d=\frac{1}{3}$ (d) $a=1, b=-1, c=\frac{1}{3}, d=-\frac{1}{3}$

16. Let $f : [0, 1] \to [0, 1]$ be twice continuously differentiable function with a unique fixed point f(x) = x for given $x_0 \in (0, 1)$ consider the iteration $x_{n+1} = f(x_n)$ for $n \geq 0$. If $L = \max_{x\in(0,1)} |f(x)|$, then which of the following are true? **CSIR NET DEC 2018**

(a) If $L < 1$, then x_n converges to x (b) x_n converges to x, provided $L \geq 1$

(c) The error $e_n = x_n - x$ satisfies $|e_{n+1}| < L|e_n|$

(d) If $f'(x) = 0$, then $|e_{n+1}| < C|e_n|^2$ for some $C > 0$

Dr. Gajendra Purohit

17. Let f(x) be the polynomial of degree atmost 2 that interpolates the data (-1, 2), (0, 1) and (1, 2). If g(x) is a polynomial of degree atmost 3 such that f(x) + g(x) interpolates the data (-1, 2), (0, 1), (1, 2) and (2, 17), then **CSIR NET FEB 2025**

(a) f(5) + g(3) = 50 (b) 2f(5) – g(3) = 4

(c) f(1) + g(3) = 50 (d) f(5) + g(3) = 74

18. If $\lambda \in R$ and $\rho \in R$ are such that the quadrature formula

$$\int_{x_0}^{x_0+h} f(x)dx \approx \lambda h(f(x_0)+f(x+h))+\rho h^3(f''(x_0)+f''(x_0+h))$$

is exact for all polynomials of degree as high as possible, then **CSIR NET FEB 2025**

(a) $2\lambda + 24\rho = 0$ (b) $7\lambda - 12\rho = 4$ (c) $2\lambda + 24\rho = -3$ (d) $7\lambda - 12\rho = 11$

19. Consider the initial value problem (IVP) $y' + y = 0$, $y(0) = 1$. **CSIR NET JULY 2025**

Let (y_n) be the iterates of forward Euler method, applied to the IVP, with step size h where $0 < h < 1$. Then which of the following statements are true?

(a) The sequence (y_n) does not converge

(b) $y_n \to 0$ as $n \to \infty$

(c) $0 \le y_n \le 1$ for n = 0, 1, 2, ...

(d) $|y(nh) - y_n| \to 0$ as $n \to \infty$

20. If $\alpha, \beta \in R$ are such that the equation $\int_0^3 f(x)dx = \frac{3}{2}[f(\alpha)+f(\alpha+\beta)]$ holds for all polynomials f(x) of degree less than or equal to 2, then which of the following statements are true? **CSIR NET JULY 2025**

(a) $(\alpha,\beta)=\left(\frac{3-\sqrt{3}}{2},\sqrt{3}\right)$ *or* $(\alpha,\beta)=\left(\frac{3+\sqrt{3}}{2},-\sqrt{3}\right)$

(b) $(\alpha,\beta)=\left(\frac{3-\sqrt{2}}{2},\sqrt{2}\right)$ *or* $(\alpha,\beta)=\left(\frac{3+\sqrt{2}}{2},-\sqrt{2}\right)$

(c) $(\alpha,\beta)=\left(\frac{3-\sqrt{5}}{2},\sqrt{5}\right)$ *or* $(\alpha,\beta)=\left(\frac{3+\sqrt{5}}{2},-\sqrt{5}\right)$

(d) $(\alpha,\beta)=\left(\frac{3-\sqrt{7}}{2},\sqrt{7}\right)$ *or* $(\alpha,\beta)=\left(\frac{3+\sqrt{7}}{2},-\sqrt{7}\right)$

21. Solve the following linear programming problem :

maximize $z = x + y$ subject to $5x + 3y \le 30$, $2x + 6y \le 25$, $2x - y \le 8$; $x \ge 0$, $y \ge 0$.

Then the optimal value of the objective function is **CSIR NET JULY 2025**

(a) 45/11 (b) 74/11 (c) 85/12 (d) 25/6

22. If p(x)is the interpolating polynomial for the data

x	-2	-1	0
y(f(x))	-1	3	1

then the value of p12 is: **CSIR NET DEC. 2025**

(a)-3/8 **(b)**-5/8 **(c)** 5/8 **(d)**7/8

23. Let S be the set of all 2×2 matrices A such that the iterative sequence generated by the Gauss-Seidel method converges for every initial guess, when employed to solve the system of equations $A\begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$. Then which of the following statements are true? **CSIR NET DEC 2025**

(a) $\begin{pmatrix} 4 & 1 \\ 2 & 3 \end{pmatrix} \in S$ (b) $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \in S$ (c) $\begin{pmatrix} 1 & 5 \\ 1 & 10 \end{pmatrix} \in S$ (d) $\begin{pmatrix} -5 & 2 \\ 1 & 4 \end{pmatrix} \in S$

Answer Key

1	2	3	4	5	6	7	8
b, c, d	a, b	d	b, c	a	a, b	a	c
9	10	11	12	13	14	15	16
d	d	a	a, b	c	a, c	a	a, c, d
17	18	19	20	21	22	23	
b, c, d	a, b	b, c, d	a	b	a	a, c, d	

MATHS CARE
BY DR GAJENDRA PUROHIT

Csir Net 2026

ONE SHOT SERIES

Revise smarter with GPSir'sOne-Shot Series – where each video covers:

- Complete topic in one video
- Clear concepts + smart tricks
- Best for quick & effective revision
- CSIR-NET focused explanations

Click here to watch the series

MARATHON

Get exam-ready with GP Sir's last-minute question practice series!
In each video, revise the most important questions from all topics, one by one.
Fast Paced, Revision Focused Series!

Click here to watch the series

ED TALKS

Ed Talks brings youexclusive interviews with CSIR-NET toppers, where they share:

- Their preparation Strategy
- Study plans & time management
- Tips, mistakes & exam-day strategies

Click here for topper's strategy

BOOKS

Books curated specially by GP Sir to crack CSIR-NET in the first attempt!

- SHORT NOTES BOOKLET
- GENERAL APTITUDE
- COMBAT SERIES (2000+ Qs Practice)

Click here to purchase book

MATHSCARE

BY DR GAJENDRA PUROHIT

IIT-JAM

SUBJECT WISE COURSES

- ORDINARY DIFFERENTIAL EQUATION
- INTEGRAL CALCULUS
- SEQUENCE & SERIES + FUNCTION
- GROUP THEORY
- LINEAR ALGEBRA

Price ~~Rs 1299/-~~

RS 699/-

CSIR-NET/GATE

SUBJECT WISE COURSES

- COMPLEX ANALYSIS
- REAL ANALYSIS
- MODERN ALGEBRA
- CALCULUS OF VARIATION + INTEGRAL EQUATION + NUMERICAL ANALYSIS
- LINEAR ALGEBRA
- DIFFERENTIAL EQUATION
- LPP + MARKOV CHAIN
- METRIC SPACE + TOPOLOGY

Price ~~Rs 1299/-~~

RS 799/-

Call **9571085397** | +919571085398

Grab Now!

Your Succes Our Priority

MATHSCARE

BY DR GAJENDRA PUROHIT

Live + Recorded Lectures

UDAY BATCH 7.0

CSIR-NET | DEC 2026

FEATURES

- CLASS PDF NOTES
- PYQS SOLUTION
- DPP WITH SOLUTION
- LIVE + RECORDED LECTURES
- TEST SERIES
- FREE ACCESS TO FOUNDATION COURSE

Include - Unit 4 - Statistics

PRICE

~~10,999/-~~

₹6,499/-

UDAY BATCH 8.0

CSIR-NET | DEC + JUNE 2027

FEATURES

- CLASS PDF NOTES
- PYQS SOLUTION
- DPP WITH SOLUTION
- LIVE + RECORDED LECTURES
- TEST SERIES
- FREE ACCESS TO FOUNDATION COURSE

Include - Unit 4 - Statistics

PRICE

~~14,999/-~~

₹10,999/-



Class PDF Notes | PYQs Solution | DPP with Solution | Live + Recorded Lectures | Test Series | Free Access to Foundation Course

lass PDF Notes | PYQs Solution | DPP with Solution | Live + Recorded Lectures | Test Series | Free Access to Foundation Course

For Any Queries:

9571085397

GP SIR

20+ Years of Teaching Experience

MATHSCARE

BY DR GAJENDRA PUROHIT

Live + Recorded Lectures

PRARAMBH BATCH 4.0

IIT JAM 2027

FEATURES

- CLASS PDF NOTES
- PYQS SOLUTION
- DPP WITH SOLUTION
- LIVE + RECORDED LECTURES
- TEST SERIES
- FREE ACCESS TO FOUNDATION COURSE

PRICE

~~10 999/-~~

5499/-

Class PDF Notes | PYQs Solution | DPP with Solution | Live + Recorded Lectures | Test Series | Free Access Foundation C



PRARAMBH BATCH 5.0

IIT JAM 2028

FEATURES

- CLASS PDF NOTES
- PYQS SOLUTION
- DPP WITH SOLUTION
- LIVE + RECORDED LECTURES
- TEST SERIES
- FREE ACCESS TO FOUNDATION COURSE

PRICE

~~14 999/-~~

8499/-

ass PDF Notes | PYQs Solution | DPP with Solution | Live + Recorded Lectures | Test Series | Free Access to Foundation Course

For Any Queries:

9571085397

GP SIR

20+ Years of Teaching Experience

SANKALP BATCH (Full Course +Test Series)

G-SET | K-SET | JET | MP-SET | TG-SET | WB-SET | AP-SET | CG-SET & HP-SET | BET | R-SET | NE-SET | ODISHA-SET

PRICE DETAILS

Original Price:
~~5999/-~~

Offer Price:
3999/-

UPTO 40% OFF

COURSE FEATURES

- Class PDF Notes
- PYQs Solution
- DPP with Video Solutions
- Test Series
- Topic-wise Combat Series Classes
- Free Access to Foundation Course

TEST SERIES

ALL SET TEST SERIES AVAILABLE

G-SET | K-SET | JET
MP-SET | TG-SET | WB-SET
AP-SET | CG-SET | HP-SET
BET | R-SET | NE-SET
ODISHA-SET

Original Price	Offer Price
~~1299/-~~	799/-



Recorded Classes | Live Classes | Test Series & DPPs | Study Material | Expert Support

MATHSCARE

BY DR. GAJENDRA PUROHIT

COMBAT SERIES

FOR IIT JAM 2027

FEATURES

- SUBJECTWISE VIDEO LECTURE
- SUBJECTWISE STRATEGY & TIPS
- SUBJECTWISE PYQ & TESTS

PRICE

~~₹ 1299/-~~

₹ 699/-

COMBAT SERIES

FOR CSIR-NET DEC. 2026

FEATURES

- SUBJECTWISE VIDEO LECTURE
- SUBJECTWISE STRATEGY & TIPS
- SUBJECTWISE PYQ & TESTS

LIMITED TIME OFFER

PRICE

~~1299/-~~

₹ 799/-

SUBJECTWISE VIDEO LECTURE | SUBJECTWISE STRATEGY & TIPS | SUBJECTWISE PYQ & TESTS

50+ Topper's & Rankers

Validity Till Exam

Call 9571085397 | +919571085398

Grab Now!

Your Success Our Priority

MATHSCARE LATEST OFFER

CSIR-NET 2026

UDAY BATCH 7.0
Session: DEC. 2026

Offer: UP TO 40% OFF

UDAY BATCH 8.0
Session: DEC.+JUNE 2027

Offer: UP TO 40% OFF

IIT JAM

PRARAMBH 4.0
Target Exam: IIT JAM 2027

Offer: UP TO 40% OFF

PRARAMBH 5.0
Target Exam: IIT JAM 2028

Offer: UP TO 45% OFF

RPSC 1ST & 2ND GRADE

UTKARSH BATCH
Offer: UP TO 46% OFF

Free Bonus

Get SAARTHI BATCH
General Knowledge (GK)
FREE

UPPSC GIC

LAKSHYA BATCH
Offer: UP TO 50% OFF

Free Bonus

Get SAARTHI BATCH
General Knowledge (GK)
FREE

OTHER COURSES

GATE 2027
PARTH BATCH

CUET-PG 2027
SARTHAK BATCH

SET EXAM
SANKALP BATCH

Offer
UP TO 50% OFF

UP TGT-PGT
LAKSHYA BATCH

Offer: UP TO 44% OFF

Free Bonus

Get SAARTHI BATCH
General Knowledge (GK)
FREE

Contact Information

For Any Queries

9571085397

8107385398

MATHS CARE
BY DR GAJENDRA PUROHIT

FOR CSIR NET EXAM

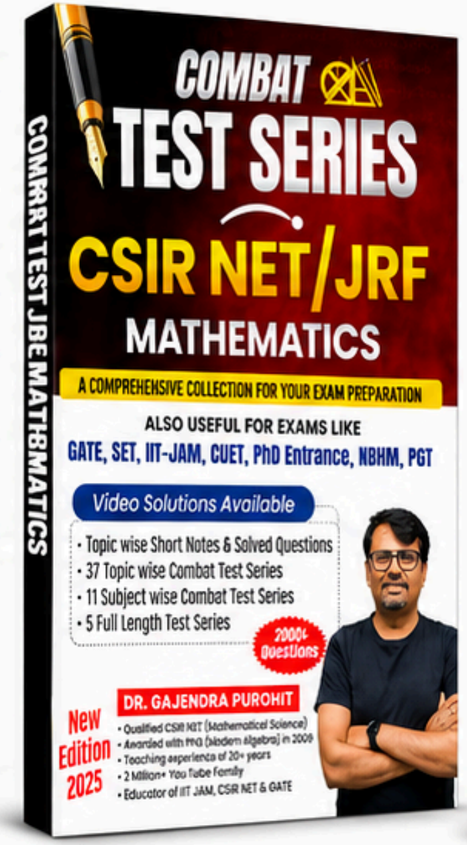
OUR BOOKS

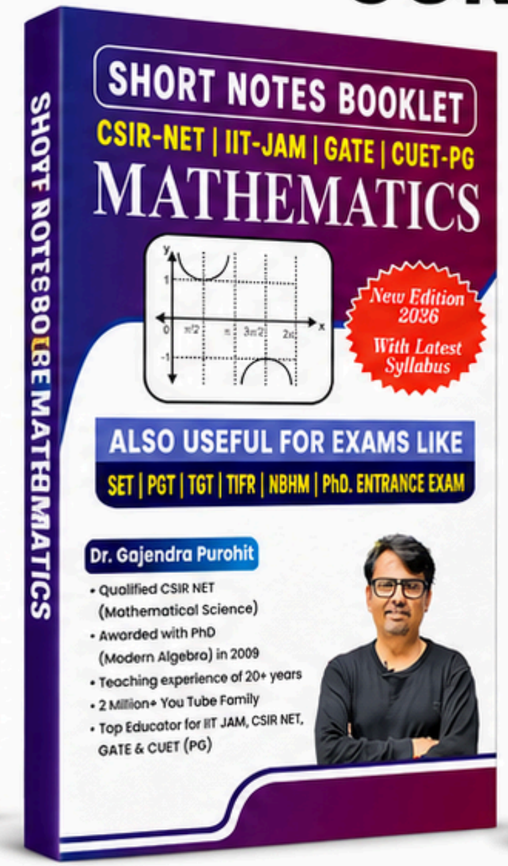
COMPREHENSIVE CONTENT
Concepts explained in simplest way

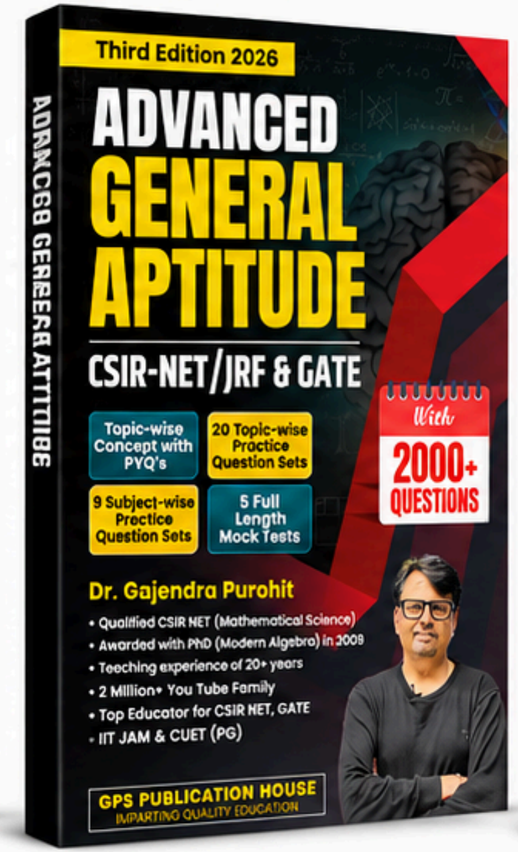
TOPIC-WISE COVERAGE
Detailed theory with practice questions

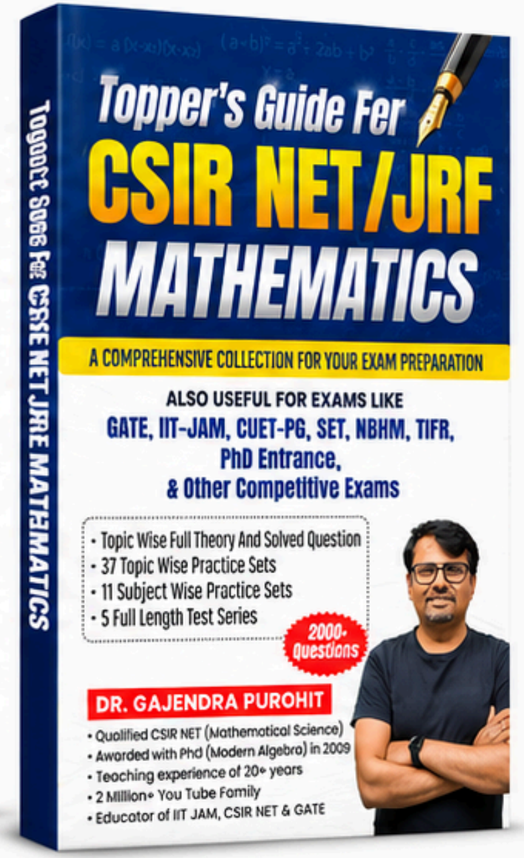
EXAM FOCUSED
Previous year questions, mock tests & more

EXPERT GUIDANCE
By Dr. Gajendra Purohit (20+ Years Experience)









AVAILABLE ON

MATHS CARE BY DR GAJENDRA PUROHIT | amazon | Flipkart

FOR MORE DETAILS
CALL ON 9571085397

MATHSCARE

YOUR COMPLETE MATHEMATICS PLATFORM

FOR COMPETITIVE EXAMS

DOWNLOAD MATHSCARE APP

- CSIR NET
- TGT-PGT
- IIT JAM
- GATE
- RPSC
- SET
- CUET PG

GET IT ON Google Play

Download on the App Store

AVAILABLE ON ANDROID & IOS

HELPLINE | For any queries or details about course and all

9571085397

