

Numerical Methods
Question Bank
Engineering Mathematics-IV (B.tech)

1. Solve the system $6x+y+z = 105$, $4x+8y+3z = 155$, $5x+4y-10z = 65$ using Gauss-Seidal method.

2. Using Newton-Raphson method, find real root of $xe^x - 2 = 0$.

3. Find $y(1.2)$ by Runge-kutta method of fourth order of $\frac{dy}{dx} = \sqrt{x^2 + y^2}$ with $y(1) = 1.5$, take $h = 0.1$.

4. Find a root of equation $x^3 - 3x + 1 = 0$ to three decimal places by Newton-Raphson method.

5. Using Runge-kutta method of fourth order, find y when $x = 0.2$ given that :

$$\frac{dy}{dx} = x + y, y(0) = 1 \text{ taking } h = 0.1$$

6. Apply Gauss-elimination method to solve the equations:

$$2x + 3y + z = 13, \quad x - y - 2z = -1, \quad 3x + y + 4z = 15$$

7. Find a root of equation $x^3 - 4x + 1 = 0$ to three decimal places by Newton-Raphson method.

8. Apply Gauss-Seidal method to solve the equations:

$$20x + y - 2z = 17, \quad 3x + 20y - z = -18, \quad 2x - 3y + 20z = 25$$

9. Evaluate $\sqrt{28}$ to four decimal places by Newton-Raphson method.

10. Solve $\frac{dy}{dx} = \frac{1}{x+y}$ for $x = 0.5$ to $x = 1$, $h = 0.5$ by using Runge-kutta fourth order method with $y(0) = 1$.

11. Apply Gauss-seidal iteration method to solve the equations:

$$2x + 3y + z = 9, \quad x + 2y + 3z = 6, \quad 3x + y + 2z = 8$$

12. Using Runge-kutta method of order 4, to find y when $x = 0.4$, given that $\frac{dy}{dx} = x + y^2$,

$$y(0) = 1, h = 0.2.$$

13. Given: $y' = -xy$ with $y(0) = 1$ by Taylor's series method the value of y as series

in powers of x is

14.. Find $f(1.5)$, $\frac{dy}{dx}$ at 0.5 and $\int_0^3 y dx$ [each bit for 2 marks] for the data

x	$f(x)$
0	4
1	3

15. Find $f^{(3)}$ for the following data:

x	$f(x)$
1	2
3	3
5	7

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