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312301 – Applied Mathematics (Sem II)

As per MSBTE's K Scheme

CO / CM / IF / AI / AN / DS

Unit IV	NUMERICAL METHODS	Marks - 14

S. N.	MSBTE Board Asked Questions	Exam Year	Marks
1.	Show that there exists a root of the equation $x2 - 2x - 1 = 0$ in (–1, 0) and find approximate value of the root by using Bisection method. (Use two iterations)	S-18	2M
2.	Solve the following system of equations by Jacobi's – Iteration method. (Two iterations) $5x + 2y + z = 12$; $x + 4y + 2z = 15$; $x + 2y + 5z = 20$	S-18, W-19	3
3.	Solve the following system of equations by using Gauss-Seidal method. (Two iterations) $15x + 2y + z = 18$; $2x + 20y - 3z = 19$; $3x - 6y + 25z = 22$	S-18, S-19	3
4.	Find the approximate root of the equation, $x4 - x - 10 = 0$ by Newton–Raphson method. (Carry out four iterations).	S-18	6
5.	Find approximate root of the equation $x2 + x - 3 = 0$ in (1, 2) by using Bisection method. (Use two iterations)	S-19, W-18	2/3
6.	Solve the following system of equations by using Gauss - Seidal method. (Two iterations) $5x - 2y + 3z = 18$; $x + 7y - 3z = 22$; $2x - y + 6z = 22$.	S-19	3
7.	Using Newton - Raphson method find the approximate value of $\sqrt[3]{100}$ (Perform 4 iterations)	S-19, S-17, W-17	6
8.	Find a real root of the equation $x3 - 4x - 9 = 0$ by using bisection method	S-22, W-18	2
9.	Find the root of the equation $\cos x - xex = 0$ using the regular-falsi method. (carry out two iterations)	S-22	3

10.	**Solve the following system of equations by using Gauss Seidal method.** **$20x + y - 2z = 17$; $3x + 20y - z = -18$; $2x - 3y + 20z = 25$.**	**S-22**	**6**
11.	**Using Newton-Raphson method to find the approximate root of the equation $x \log 10x = 1.2$. (carry out three iterations)**	**S-22**	**6**
12.	**Show that the root of $x3 - 9x + 1 = 0$ lies between 2 and 3.**	**W-18**	**2**
13.	**Solve the following system of equations by using Gauss Seidal method (use four iterations) correct upto 3 places of decimals.** **$x + 7y - 3z = -22$; $5x - 2y + 3z = 18$; $2x - y + 6z = 22$**	**W-18, W-17**	**6**
14.	**Using Newton-Raphson method find the approximate root of the equation correct upto 3 places of decimals.** **$x3 - 2x - 5 = 0$ (Use four iterations)**	**W-18**	**6**
15.	**Find a real root of equation $x3 + 4x - 9 = 0$ in the interval (1,2) by using bisection method (only one iteration)**	**W-19**	**2**
16.	**Solve the equation by Gauss - Seidal method. (two iterations only)** **$10x + y + 2z = 13$; $3x + 10y + z = 14$; $2x + 3y + 10z = 15$**	**W-19, S-17**	**3**
17.	**Using Newton - Raphson method find the approximate root of the equation (use four iterations) $x2 + x - 5 = 0$**	**W-19**	**6**
18.	**Show that the root of the equation $x3 - x - 4 = 0$ lies between 0 & 2.**	**W-22, S-17**	**2**
19.	**Solve the following by using Jacobi's method upto four iterations** **$20x + y - 2z = 17$; $3x + 20y - z = -18$; $2x - 3y + 20z = 25$.**	**W-22, W-18, W-19**	**6**
20.	**Using Bisection method find approximate roots of the equation $x3 - x - 4 = 0$ upto three iterations.**	**W-22**	**3**
21.	**Find approximate value of $\sqrt[3]{7}$ by using Newton Raphson method. (three iterations only)**	**W-22, W-17**	**6**
22.	**Show that the root of $x3 - 9x + 1 = 0$ lies between 2 and 3. Obtain the roots by bisection method (3 iterations only)**	**S-17**	**4**
23.	**Using Regula – Falsi method, find the root of $xex - 3 = 0$ (three iterations only)**	**S-17**	**4**

24.	**Using Bisection method, find the approximate root of $x^3 - 2x - 5 = 0$ in the interval (2, 3) (3 iterations only)**	**S-17, S-19**	**4**
25.	**Find the roots of the equation using Newton–Raphson method $x^2 - 4x - 6 = 0$ near to 5. (three iterations only)**	**S-17**	**4**
26.	**Solve by Jacobi's method upto 3 iterations only $30x + y + z = 32$; $x + 30y + z = 32$; $x + y + 30 = 22$**	**S-17**	**4**
27.	**Solve by Gauss–seidal method (3 iterations only) $6x + y + z = 105$; $4x + 8y + 3z = 155$; $5x + 4y - 10z = 65$**	**S-17, W-17**	**4**
28.	**Solve by Jacobi's method: $4x + y + 2z = 12$; $-x + 11y + 4z = 33$; $2x - 3y + 8z = 20$ (3 iterations only).**	**S-17**	**4**
29.	**Using Gauss seidal method find first iteration for the system of equations: $8x + 2y + 3z = 30$; $x - 9y + 2z = 1$; $2x + 3y + 6z = 31$**	**S-18**	**2**
30.	**Show that the root of equation $xe^x - 3 = 0$ lies in the interval (1, 2).**	**S-18**	**2**
31.	**Using Bisection method find the approximate root of the equation $x^3 - 6x + 3 = 0$ (Perform three iterations)**	**S-18, W-19**	**4**
32.	**Use Regular falsi method to find approximate root of the equation $x^3 - x - 4 = 0$ (Three iterations)**	**S-18**	**4**
33.	**Use Newton Raphson method to evaluate $\sqrt[3]{20}$ (upto three iterations only)**	**S-18**	**4**
34.	**Using Bisection method find the root of the equation $x^3 - 4x - 9 = 0$in the interval (2, 3).**	**S-18**	**4**
35.	**Using Jacobi's method, solve the system of equations: $10x + 2y + z = 9$; $2x + 20y - 2z = 44$; $-2x + 3y + 10z = 22$ (Perform three iterations)**	**S-18**	**4**
36.	**Using Gauss-seidal method, solve the equations: $5x - y = 9$; $x - 5y + z = -4$; $y - 5z = 15$ (Perform three iterations)**	**S-18**	**4**
37.	**Using Jacobi's method, solve the equations $2x + 3y - 4z = 1$; $5x + 9y + 3z = 17$; $8x - 2y - z = 5$ (Perform Three Iterations)**	**S-18**	**4**

38.	**Show that there exist a root of the equation $x^3 - 4x + 1 = 0$ in the interval (1, 2)**	**S-19**	**2**
39.	**Find by Jacobi's method, the first iteration only for the following equations $5x - y = 9$; $x - 5y + z = -4$; $y - 5z = 6$**	**S-19**	**2**
40.	**Using false position method, find the root of the equation $x^2 + x - 3 = 0$ in the interval (1, 2) by performing three iterations.**	**S-19, W-18**	**4**
41.	**Solve $x^3 - x - 1 = 0$ by Newton Raphson method (up to three iterations.)**	**S-19, W-19**	**4**
42.	**Find the root of $e^{-x} - x = 0$ by bisection method (up to three iterations.)**	**S-19**	**4**
43.	**Solve the following equations by Jacobi's method (take three iterations.)** **$20x + y - 2z = 17$; $2x - 3y + 20z = 25$; $3x + 20y - z = 18$**	**S-19**	**4**
44.	**Solve the equations by GuassSeidal method (up to three iterations.)** **$8x + 2y + 3z = 30$; $x - 9y + 2z = 1$; $2x + 3y + 6z = 31$**	**S-19**	**4**
45.	**With the following system of equations:** **$3x + 2y = 4.5$; $2x + 3y - z = 5$; $-y + 2z = 0.52$** **Set up the Gauss Seidal iterations scheme for solution. Iterate two times, using initial approximations $x_0 = 0.4$, $y_0 = 1.6$, $z_0 = 0.4$**	**S-19**	**4**
46.	**Show that there exist a root of the equation $x^3 + 2x^2 - 8 = 0$ between 1 and 2.**	**W-17**	**2**
47.	**Solve the following equations by using Gauss-Seidal method (only first iteration)** **$10x + 2y + z = 9$; $x + 10y - z = 22$; $-2x + 3y + 10z = 22$**	**W-17**	**2**
48.	**Using Regula-Falsi method, find approximate root of $x^3 - 9x + 1 = 0$ (Three iterations only)**	**W-17, W-19**	**4**
49.	**Solve by Newton-Raphson method $x^3 + 2x - 20 = 0$ (Three iterations only)**	**W-17**	**4**
50.	**Solve the equation by Jacobi's method. (Three iterations only)** **$10x + y + 2z = 13$; $3x + 10y + z = 14$; $2x + 3y + 10z = 15$**	**W-17**	**4**
5.1	**With the following system of equations:** **$3x + 2y = 4.5$; $2x + 3y - z = 5$; $-y + 2z = 0.52$** **Find one iteration only using Gauss Seidal Method**	**W-18**	**2**

52.	**Using Bisection method find the approximate root of the equation x log10x = 1.2.**	**W-18, W-19**	**4**
	Use Newton-Raphson method to find root of equation x2+ x – 3 = 0 (upto three iterations)	**W-18**	**4**
53.	**Solve the following equation using Gauss Seidal method. 10x + y + z = 12; x + 10y + z = 12; x + y + 10z = 12**	**W-18**	**4**
54.	**Show that root of equation x2+ x – 3 = 0 lies between 2 and 3.**	**W-19**	**2**
55.	**With the following system of equations: 5x – y = 9; 5y - z = 6; x + 5z = -3 Set up Gauss seidal iteration scheme for the solution. Iterate two times using initial approximations, x0 = 1.8, y0 = 1.2, z0 = -0.96**	**W-19**	**4**

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