STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2019–20 & thereafter)

B. Com. / B.Com.(A&F) DEGREE EXAMINATION, NOVEMBER 2023
THIRD SEMESTER

COURSE	:	**ALLIED – CORE**
PAPER	:	**MATHEMATICS FOR COMMERCE**
SUBJECT CODE	:	**19MT/AC/MT35**
TIME	:	**3 HOURS**

MAX. MARKS : 100

SECTION – A **(10 × 2 = 20)**
ANSWER ANY TEN QUESTIONS

1. Define skew symmetric matrix and give an example.
2. State Cayley Hamilton Theorem.
3. Find the eigen values of the matrix $\begin{pmatrix} 3 & 4 \\ 0 & 5 \end{pmatrix}$.
4. Form a quadratic equation one of whose roots is $4+i$
5. If α, β, γ are the roots of $x^3 + px^2 + qx + r = 0$, Find the value of $\sum \frac{1}{\alpha^2}$.
6. If $y = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \ldots\infty$, Show that $x = y + \frac{y^2}{2!} + \frac{y^3}{3!} + \ldots\infty$,
7. Show that $\dfrac{\frac{1}{2!} + \frac{1}{4!} + \frac{1}{6!} + \ldots\infty}{\frac{1}{1!} + \frac{1}{3!} + \frac{1}{5!} + \ldots\infty} = \frac{e-1}{e+1}$.
8. Write the expansion of $log\ (1 + x)$ and $log(1 - x)$.
9. Write the formula for Newton Raphson method.
10. Write the condition of convergence of Gauss Seidal method to solve a system of algebraic linear equations.
11. Define a general linear programming problem.
12. Define surplus variable.

SECTION – B **(5 × 8 = 40)**
ANSWER ANY FIVE QUESTIONS

13. Verify Cayley Hamilton theorem for the matrix $\begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$ and hence find its inverse.
14. Find the eigen values and eigen vectors of the matrix $\begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{pmatrix}$.
15. Solve the equation $x^3 - 19x^2 + 114x - 216 = 0$ given that the roots are in geometric progression.

16. Sum the series $1+\frac{1+2}{2!}+\frac{1+2+2^2}{3!}+...\infty$.
17. Find the sum to infinity of the series $\frac{4}{2\cdot 4}+\frac{4\cdot 5}{2\cdot 4\cdot 6}+\frac{4\cdot 5\cdot 6}{2\cdot 4\cdot 6\cdot 8}+\dots$.
18. Solve the system of equations $x+2y+z=3,\ 2x+3y+3z=10,$ $3x-y+2z=13$ by Gauss elimination method.
19. Solve the following LPP by simplex method.

Maximize $z=21x_1+15x_2$ subject to the constraints $-x_1-x_2\geq -6,$ $4x_1+3x_2\leq 12,$ $x_1,x_2\geq 0.$

SECTION – C **(2 × 20 = 40)**

ANSWER ANY TWO QUESTIONS

20. Diagonalize the matrix $\begin{pmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{pmatrix}$.

21.(a) Solve $6x^5+11x^4-33x^3-33x+11x+6=0$.

(b) Sum the series $\frac{2}{3}\cdot\frac{4}{6}+\frac{2}{3}\cdot\frac{4}{6}\cdot\frac{6}{9}+\frac{2}{3}\cdot\frac{4}{6}\cdot\frac{6}{9}\cdot\frac{8}{12}+...\infty$ (10+10)

22. (a) Find a root of the equation $x^3=6x-4$ correct to 4 places of decimals by Newton Raphson method.

(b) Using Big M method solve the following LPP.

Maximize $z=2x_1+5x_2$ subject to the constraints

$$x_1\leq 40$$
$$x_2\leq 30$$
$$x_1+x_2\geq 60$$
$$x_1,x_2\geq 0$$

(10+10)

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