Time: 1.30 hrs

Maximum: 30 Marks

PART – A (2 x 5 = 10 Marks)

Q.1. Answer ALL questions

		CO #	Blooms Level
a.	Find the rank of the matrix $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$	CO1	K1
b.	Prove that the diagonal elements of a skew-symmetric matrix are zero	CO1	K1
c.	Find the spectrum and spectral radius of the matrix $\begin{pmatrix} 1 & 1 \\ 2 & 2 \end{pmatrix}$	CO1	K2
d.	Find the total derivative of $z = e^x \sin y$	CO2	K1
e.	Find $\frac{dy}{dx}$ where $x \sin(x - y) - (x + y) = 0$	CO2	K2

PART – B (10 x 2 = 20 Marks)

Answer ALL Questions

		Marks	CO#	Blooms Level
2.a.	Solve the system of linear equations by Gauss Elimination method $3x + 7y + 8z = -13,$ $2x + \quad 9z = -5,$ $-4x + y - 26z = 2$	5	COI	K2
b.	Find the Diagonalization of matrix $A = \begin{bmatrix} -19 & 7 \\ -42 & 16 \end{bmatrix}$	5	COI	K2

(OR)

		Marks	CO#	Blooms Level
c.	Find the eigenvectors of the matrix $\begin{pmatrix} 16 & 0 & 0 \\ 48 & -8 & 0 \\ 84 & -24 & 4 \end{pmatrix}$	5	CO1	K2
d.	Find out which type of conic section is represented by Quadratic function $41x_1^2 - 24x_1x_2 + 34x_2^2 = 0$	5	CO1	K2
3.a.	If $z = xyf\left(\frac{y}{x}\right)$ show that $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = 2z$ and if z is constant then $\frac{f'\left(\frac{y}{x}\right)}{f\left(\frac{y}{x}\right)} = \frac{x\left(y + x\frac{dy}{dx}\right)}{y\left(y - x\frac{dy}{dx}\right)}$	5	CO2	K2
b.	Expand $f(x, y) = \log(x + e^y)$ by Taylor's series in powers of $(x - 1)$ and y.	5	CO2	K2

(OR)

		Marks	CO#	Blooms Level
c.	If $x^x y^y z^z = c$, show that at $x = y = z$ $\frac{\partial^2 z}{\partial x \partial y} = -(x \ln ex)^{-1}$	6	CO2	K2
d.	Discuss the maxima and minima of $f(x, y) = \sin x + \sin y + \sin(x + y)$	4	CO2	K2