G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.
(For those admitted in June 2023 and later)

PROGRAMME AND BRANCH: B.Sc., PHYSICS AND CHEMISTRY

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
I	PART - III	ELECTIVE GENERIC-1	U23MA1A1	THEORY OF EQUATIONS AND MATRICES

Date & Session: 14.11.2024 / FN   **Time : 3 hours**   **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer ALL Questions.
CO1	K1	1.	The derivative of $y = e^{2x}$ is _____. a) e^{2x} b) $2e^{2x}$ c) 2 d) 0
CO1	K2	2.	The nth derivative of e^{ax} is_____. a) $a^n e^{ax}$ b) $a^2 e^{ax}$ c) $a^n e^{nx}$ d) $a^2 e^{nx}$
CO2	K1	3.	Rate of convergence of the Newton-Raphson method is generally _____. a) Linear b) Quadratic c) Super-linear d) Cubic
CO2	K2	4.	In Newton Raphson method if the curve f(x) is constant then _____. a) f''(x)=0 b) f(x)=0 c) f'(x)=0 d) f'(x)=c
CO3	K1	5.	If M is a 7 x 5 matrix of rank 3 and N is a 5 x 7 matrix of rank 5 then rank(MN) is_____. a) 5 b) 3 c) 2 d) 1
CO3	K2	6.	Unit matrix of order n has rank =_____. a) 1 b) 0 c) n d) n+1
CO4	K1	7.	Eigen values of _____ matrix are real. a) Symmetric b) Skew symmetric c) Hermitian d) Skew Hermitian
CO4	K2	8.	The Caley – Hamilton theorem deals only with _____. a) unitary matrices b) square matrices c) inverse matrices d) orthogonal matrices
CO5	K1	9.	Laplace transform of f(t) is given by_____. a) $f(s) = \int_0^\infty e^{-st} f(t)dt$ b) $f(t) = \int_0^\infty e^{-st} f(t)dt$ c) $F(s) = \int_0^\infty e^{-st} F(t)dt$ d) $F(s) = \int_0^\infty e^{-st} f(t)dt$
CO5	K2	10.	$L^{-1}[1] =$ a) 1 b) 0 c) u(t) d) $\delta(t)$
Course Outcome	Bloom's K-level	Q. No.	SECTION – B (5 X 5 = 25 Marks) Answer ALL Questions choosing either (a) or (b)
CO1	K3	11a.	Find the derivative of the product of the functions $f(x) = x^4$, and $g(x) = Logx$, using the lebinitz rule. **(OR)**
CO1	K3	11b.	Find the nth derivative of $log(ax + b)$.

Course Outcome	Bloom's K-level	Q. No.	
CO2	K3	12a.	Use Newton's Method to determine x_2 for $f(x) = x^3 - 7x^2 + 8x - 3$ if $x_0 = 5$.
			(OR)
CO2	K3	12b.	Briefly explain Horner's Method,
CO3	K4	13a.	Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$
			(OR)
CO3	K4	13b.	Write down the properties of Homogeneous system of linear equation.
CO4	K4	14a.	Find the Eigen value of $\begin{bmatrix} 0 & 1 \\ -6 & 5 \end{bmatrix}$.
			(OR)
CO4	K4	14b.	If $A = \begin{bmatrix} 1 & 0 \\ 0 & 5 \end{bmatrix}$ write A^2 in terms of A and I, using Cayley Hamilton theorem.
CO5	K5	15a.	Show that $L(1) = \frac{1}{s}$.
			(OR)
CO5	K5	15b.	Compute the inverse Laplace transform of $Y(s) = \frac{5s}{s^2+9}$

Course Outcome	Bloom's K-level	Q. No.	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Find the n$^{\text{th}}$ derivative of $y = sin(ax + b)$.
			(OR)
CO1	K3	16b.	Find the n$^{\text{th}}$ derivative of $y = e^x(2x + 3)^3$ by using Leibnitz formula.
CO2	K4	17a.	Use Newton's method to find the root $x^4 - 5x^3 + 9x + 3 = 0$, accurate to six decimal places in the interval [4,6].
			(OR)
CO2	K4	17b.	Use Horner's method to evaluate $P(x) = 2x^4 - 3x^2 + 3x - 4$ at $x_0 = -2$.
CO3	K4	18a.	Find the rank of matrix $\begin{bmatrix} -1 & -2 & -3 \\ -4 & -5 & -6 \\ -7 & -8 & -9 \end{bmatrix}$
			(OR)
CO3	K4	18b.	Solve with the help of matrices, the simultaneous equations $x + y + z == 3$, $x + 2y + 3z = 4, x + 4y + 9z = 6$
CO4	K5	19a.	Find the Eigen values of $\begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$.
			(OR)
CO4	K5	19b.	Verify the cayley Hamilton theorem for $A = \begin{bmatrix} 3 & 4 \\ -5 & -5 \end{bmatrix}$.
CO5	K5	20a.	Find the Laplace transform of $\sin t \sin 2t \sin 3t$
			(OR)
CO5	K5	20b.	Find the inverse Laplace transform for $\frac{s}{(s+2)^2}$