Reg. No. | | | | | | | | |

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

UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.
(For those admitted in June 2023 and later)

PROGRAMME AND BRANCH: B.Sc., MATHEMATICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
I	PART - III	CORE - 1	U23MA101	ALGEBRA AND TRIGONOMETRY

Date & Session: 24.04.2025/AN **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 equation $x+\frac{1}{x}=0$ is _____. a) not a reciprocal equation b) a standard reciprocal equation c) a reciprocal equation first type and odd degree d) a reciprocal equation Second type and even degree
CO1	K2	2.	The reciprocal equation $2x^5-15x^4+37x^3-37x^2+15x-2=0$ has _____ a)-1 one root b) 1 as one root c) 1 and -1 as roots d) i as one root
CO2	K1	3.	$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$ = _____ . a) e b) 0 c) 1/n d) e^2
CO2	K2	4.	log(1+x)=_____. a) $x-\frac{x^2}{2}+\frac{x^3}{3}-.....$ b) $x+\frac{x^2}{2}+\frac{x^3}{3}-.....$ c) $1-\frac{x^2}{2}+\frac{x^3}{3}-.....$ d) $1+\frac{x^2}{2}+\frac{x^3}{3}-.....$
CO3	K1	5.	if A,B,C are matrices of the same order A+(B+C)= _____. a) (A+B)+C b) A+B+C c) AB+C d) A+BC
CO3	K2	6.	Matrix addition is _____. a) commutative b) scalar c) similar d) diagonal
CO4	K1	7.	**S**in(2θ) = _____. a) 2sin(θ)cos(θ**)** b) sin(θ)cos(θ**)** c) sin(2θ)cos(θ**)** d) 2sin(2θ)cos(2θ**)**
CO4	K2	8.	1 + tan²(θ) = a) sec (θ) b) sec²(θ) c) cosec (θ) d) tan (2θ)

CO5	K1	9.	$\sinh x$ can be extended as an infinite series _____. a) $1+\frac{x^2}{2!}+\frac{x^4}{4!}+.....$ b) $x+\frac{x^3}{3!}+\frac{x^5}{5!}+.....$ c) $x-\frac{x^3}{3!}+\frac{x^5}{5!}+.....$ d) $x+\frac{x^3}{3}+\frac{x^5}{5}+.....$
CO5	K2	10.	$\cos(ix) =$ _____ . a) $i\cosh x$ b) $\cosh x$ c) $-i\cosh x$ d) $-\cosh x$
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.	If 2 and 3 are the roots of the equations $6x^6-35x^5+56x^4-56x^2+35x-6=0$ find the remaining roots. **(OR)**
CO1	K3	11b.	Diminish the roots of the equation $x^3+x^2+x-100$ by 4.
CO2	K3	12a.	From the equation with rational coefficients one of whose root is $\sqrt{2}+\sqrt{3}$. **(OR)**
CO2	K3	12b.	Find the coefficient of x^{32} in the expansion of $\left(x^4-\frac{1}{x^3}\right)^{15}$.
CO3	K4	13a.	Find the eigen value of the matrix $\begin{bmatrix}3&1&4\\0&2&6\\0&0&5\end{bmatrix}$ **(OR)**
CO3	K4	13b.	Calculate A^4 when A=$\begin{bmatrix}1&3\\2&4\end{bmatrix}$
CO4	K4	14a.	Find the approximately the value of θ radians if $\frac{\sin\theta}{\theta}=\frac{863}{864}$ **(OR)**
CO4	K4	14b.	Prove that . $2^5\cos^6\theta=\cos6\theta+6\cos4\theta+15\cos2\theta+10$
CO5	K5	15a.	Show that $\sinh^{-1}x=\log_e\left(x+\sqrt{x^2+1}\right)$. **(OR)**
CO5	K5	15b.	Prove that $\frac{1+\tan h\,x}{1-\tan h\,x}=\cosh2x+\sinh2x$.

Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either in (a) or (b)**
CO1	K3	16a.	Solve $6x^5+x^4-43x^3-43x^2+x+6=0$. **(OR)**
CO1	K3	16b.	Solve $x^4-12x^3+48x^2-72x+35=0$ by removing the second term.
CO2	K4	17a.	Sum of the series $1+\frac{1+3}{2!}+\frac{1+3+3^2}{3!}+\frac{1+3+3^2+3^3}{4!}+.....\infty$ **(OR)**

CO2	K4	17b.	Find the coefficient of x^n in the expansion of $\frac{1+2x-3x^2}{e^x}$
CO3	K4	18a.	Diagonalizable $\begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$ the matrix. **(OR)**
CO3	K4	18b.	Find the characteristic equation of the matrix $\begin{bmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{bmatrix}$
CO4	K5	19a.	Expand $\sin 7\theta$ in power of $\cos\theta$ and $\sin\theta$. Hence prove that $\frac{\sin 7\theta}{\sin\theta} = 7 - 56\sin^2\theta + 112\sin^4\theta - 64\sin^6\theta$ **(OR)**
CO4	K5	19b.	Show that $\lim_{x\to 0} \frac{3\sin x - \sin 3x}{x - \sin x} = 24$.
CO5	K5	20a.	If $\tan(\vartheta + i\varphi) = \cos\alpha + i\sin\alpha$ prove that 1. $\theta = \frac{1}{2}n\pi + \frac{1}{4}\pi$ 2. $\varphi = \frac{1}{2}\log\tan\left(\frac{\pi}{4} + \frac{\alpha}{2}\right)$ **(OR)**
CO5	K5	20b.	Sum of the series $\frac{1}{\sin\theta\sin 2\theta} + \frac{1}{\sin 2\theta\sin 3\theta} + ...n terms$ $\operatorname{cosec}\theta\ \operatorname{cosec}2\theta + \operatorname{cosec}2\theta\ \operatorname{cosec}3\theta + \ldots\ldots\ldots$ n terms.