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

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., MATHEMATICS

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

Date & Session: 09.11.2024/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 remainder when $x^2 - x - 1$ is divided by $x - 2$ is _________. a) -2 b) -4 c) 3 d) 1
CO1	K2	2.	To determine negative root, change x into ___________. a) $2x$ b) $-x$ c) $\frac{1}{x}$ d) $-x^2$
CO2	K1	3.	The coefficient of x^n in the infinite series $1 + \frac{b+ax}{1!} + \frac{(b+ax)^2}{2!} + \cdots + \frac{(b+ax)^n}{n!} + \cdots is$ -- __________. a) $\frac{e^{-b}a^n}{n!}$ b) $\frac{e^{b}a^n}{n!}$ c) $\frac{(b+ax)^n}{n!}$ d) $-\frac{(b+ax)^n}{n!})$
CO2	K2	4.	$1 - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} + \cdots (-1)^n \frac{1}{n!} + \cdots =$------. a) e b) e^{-1} c) e^x d) e^{-x}
CO3	K1	5.	The characteristic equation of $\begin{pmatrix} 3 & 2 \\ 1 & 4 \end{pmatrix}$ is _____________. a) $\lambda^2 - 18\lambda + 10 = 0$ b) $\lambda^2 - 7\lambda + 10 = 0$ c) $\lambda^2 - 18\lambda + 5 = 0$ d) $\lambda^2 - 8\lambda + 1 = 0$
CO3	K2	6.	The product of eigen values of $\begin{pmatrix} 3 & 2 \\ 1 & 6 \end{pmatrix}$ is _______. a) 5 b) 14 c) 16 d) 20
CO4	K1	7.	When n is even, the number of terms in the expansion of $\left(x + \frac{1}{x}\right)^n$ is ___. a) $n + 1$ b) n c) $n + 2$ d) $2n$
CO4	K2	8.	$x^n - \frac{1}{x^n} =$ ___________. a) $2isinn\theta$ b) $2cosn\theta$ c) $2cos\theta$ d) $2isin\theta$
CO5	K1	9.	$sin\, h(ix) =$ ________. a) $cosx$ b) $-coshx$ c) $isinx$ d) $-sinhx$
CO5	K2	10.	$\sec^2 x - \tan^2 x =$ ____________. a) -1 b) 2 c) -2 d) 1

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.	Determine the quotient and remainder when $2x^6 + 3x^5 - 15x^2 + 2x - 4 = 0$ is divided by $x + 5$. **(OR)**
CO1	K3	11b.	Determine the equation when we diminish by 3 to the roots of the equation $x^5 - 4x^4 + 3x^3 - 4x + 6 = 0$.

CO2	K3	12a.	Compute the summation of the series $\frac{5}{1!}+\frac{7}{3!}+\frac{9}{5!}+\cdots$ **(OR)**
CO2	K3	12b.	Compute the summation the series $1+\frac{1+3}{2!}+\frac{1+3+3^2}{3!}+\frac{1+3+3^2+3^3}{4!}+\cdots to\ \infty$
CO3	K4	13a.	Compute the eigen value and eigen vector of $\begin{pmatrix}3 & 2\\ 1 & 4\end{pmatrix}$ **(OR)**
CO3	K4	13b.	Compute the eigen value of $\begin{pmatrix}4 & 1\\ 3 & 2\end{pmatrix}$
CO4	K4	14a.	Expand $cos8\theta$ in a series of sines of multiples of θ. **(OR)**
CO4	K4	14b.	Expand $\cos^6\theta$ in a series of cosines of multiples of θ.
CO5	K5	15a.	Determine the expression of $\cosh^6\theta$ in a series of hyperbolic cosines of multiples of θ. **(OR)**
CO5	K5	15b.	If $\cos(x+iy)=cos\theta+isin\theta$, prove that $cos2x+cosh2y=2$.

Course Outcome	Bloom's K-level	Q. No.	<u>SECTION – C</u> (5 X 8 = 40 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)
CO1	K3	16a.	Show that the equation $x^4-3x^3+4x^2-2x+1=0$ can be transformed into a reciprocal equation by diminishing the roots by unity. Hence solve the equation. **(OR)**
CO1	K3	16b.	Given that the equation $x^3-3x+1=0$ has a root lies between 1 and 2.Find out it to three places of decimals by Horner's method.
CO2	K4	17a.	Evaluate the summation of the series $\frac{1^2}{1!}+\frac{1^2+2^2}{2!}+\frac{1^2+2^2+3^2}{3!}+\cdots to\ \infty$. **(OR)**
CO2	K4	17b.	Show that $\log_e b=\frac{1}{2}\log_e a+\frac{1}{2}\log_e c+\frac{1}{2ac+1}+\frac{1}{3}.\frac{1}{(2ac+1)^3}+\cdots$.
CO3	K4	18a.	Analyze the proof of Cayley Hamilton theorem. **(OR)**
CO3	K4	18b.	Compute the eigen value and eigen vector of $\begin{pmatrix}-2 & 2 & -3\\ 2 & 1 & -6\\ -1 & -2 & 0\end{pmatrix}$
CO4	K5	19a.	Determine the expansion of $\sin^6\theta$ in a series of cosines of multiples of θ. **(OR)**
CO4	K5	19b.	Determine the expansion of $\cos^2\theta\sin^4\theta$ in a series of cosines of multiples of θ.
CO5	K5	20a.	Resolve into real and imaginary parts of tan $h(1+i)$. **(OR)**
CO5	K5	20b.	Prove that if $\tan(x+iy)=u+iv$, then $\frac{u}{v}=\frac{sin2x}{sinh2y}$.