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

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

UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.
(For those admitted in June 2024 and later)

PROGRAMME AND BRANCH: B.Sc., STATISTICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
I	PART - III	ELECTIVE GENERIC-1	U24ST1A1	MATHEMATICS FOR STATISTICS

Date & Session: 26.04.2025/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.	In the decomposition of partial fractions, the denominator must be: a) A polynomial in its factored form b) A prime number c) A constant d) Any expression
CO1	K2	2.	If P is of lower degree than Q, $\frac{P}{Q}$ is called the _____ fraction. a) proper b) improper c) simple d) none of the above
CO2	K1	3.	The value of e is. a) 1.7183 b) 2.71828 c) 0.71828 d) 3
CO2	K2	4.	Which of the following is logarithmic series? a) $1+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots$ b) $1+x+x^2+x^3+\cdots$ c) $x-\frac{x^2}{2}+\frac{x^3}{3}-\cdots$ d) $x-\frac{x^2}{2!}+\frac{x^3}{3!}-\cdots$
CO3	K1	5.	If one root of the equation is 2+i then the other root is. a) i b) 2-i c) -i d) 2
CO3	K2	6.	A polynomial equation of degree n has at most how many roots? a) n-1 b) n+1 c) n d) Infinite
CO4	K1	7.	A function that has only one output for every input is called: a) Multi-valued function b) Single-valued function c) Inverse function d) Periodic function
CO4	K2	8.	The derivative of a constant function is always: a) Zero b) One c) The same constant d) Undefined
CO5	K1	9.	If there is no change in sign of f(x) when x is changed to –x, then function is called ____ function. a) odd b) periodic c) even d) implicit
CO5	K2	10.	The nth derivative of a function is obtained by: a) Differentiating the function once b) Integrating the function n times c) Differentiating the function n times d) Adding a constant to the function
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.	Apply partial fractions method and split $\frac{2x^2+3x+4}{(x-1)(x^2+2)}$. **(OR)**
CO1	K3	11b.	Compute $\frac{x+4}{(x^2-4)(x+1)}$

CO2	K3	12a.	Show that $\frac{\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\cdots}{\frac{1}{1!}+\frac{1}{3!}+\frac{1}{5!}+\cdots}=\frac{e-1}{e+1}$ **(OR)**
CO2	K3	12b.	Determine the proof of $\log x=\frac{x-1}{x+1}+\frac{1}{2}\frac{x^2-1}{(x+1)^2}+\frac{1}{3}\frac{x^3-1}{(x+1)^3}+\cdots$.
CO3	K4	13a.	Infer the roots of $x^4+2x^3-5x^2+6x+2=0$, given that 1+i is a root. **(OR)**
CO3	K4	13b.	If the roots of $x^3+px^2+qx+\lambda=0$ *are in G.P. Show that* $\lambda p^3=q^3$.
CO4	K4	14a.	If $3x^2-7xy+2y^2+2x-y+3=0$ *find y when* $x=3$. **(OR)**
CO4	K4	14b.	Discover the maximum and minimum value of the function f(x,y) = $x^2y^2 - x^2 - y^2$.
CO5	K5	15a.	Predict the value of $x\xrightarrow{lim}0\frac{1-cos\,x}{x}$. **(OR)**
CO5	K5	15b.	If $u=\frac{xy}{x+y}$, show that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=u$.

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.	Construct $\frac{x}{(1+x^2)(3-2x)}$ into partial fractions. **(OR)**
CO1	K3	16b.	Prove that $\frac{1}{(1-ax)^2(1-bx)}=\frac{A}{(1-ax)^2}+\frac{AB}{1-ax}+\frac{B^2}{1-bx}$ if $\frac{1}{(1-ax)(1-bc)}=\frac{A}{1-ax}+\frac{B}{1-bx}$
CO2	K4	17a.	Sum the series $\frac{1}{10}+\frac{1.4}{10.20}+\frac{1.4.7}{10.20.30}+\cdots$ **(OR)**
CO2	K4	17b.	Prove that $\log\sqrt{12}=1+\left(\frac{1}{2}+\frac{1}{3}\right)\frac{1}{4}+\left(\frac{1}{4}+\frac{1}{5}\right)\frac{1}{4^2}+\left(\frac{1}{6}+\frac{1}{7}\right)\frac{1}{4^3}+\cdots$.
CO3	K4	18a.	If the roots are of $x^3+px^2+qx+r=0$ *are in A.P. Show that* $2p^3-9pq+27r=0$. **(OR)**
CO3	K4	18b.	Assuming α,β,γ are the roots of $x^3+ax^2+bx+c=0$, find the equation whose roots are $\beta+\gamma-2\alpha$, $\gamma+\alpha-2\beta$, $\alpha+\beta-2\gamma$.
CO4	K5	19a.	Differentiate $3x^5 logx$. **(OR)**
CO4	K5	19b.	Differentiate $\tan^{-1}\frac{\cos x}{1+\sin x}$.
CO5	K5	20a.	Prove that $\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=sin\,2u$ if $u=tan^{-1}\left(\frac{x^3+y^3}{x-y}\right)$. **(OR)**
CO5	K5	20b.	Find the maximum and minimum values of the function. $f(x,y)=x^2y^2-x^2-y^2$.