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

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

UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.

(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: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.	What is the degree of the polynomial $a_0x^3+a_1x^2+a_2x+a_3$? a) 0 b) 1 c) 2 d) 3
CO1	K2	2.	Which of the following is proper fraction? a) $\frac{4x+3}{2x^2+x+1}$ b) $\frac{3x^2+4}{2x^2+3}$ c) $\frac{x^6}{3x^4}$ d) $3x^5$
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 1+i then the other root is. a) i b) 1-i c) -i d) 1
CO3	K2	6.	The general form of arithmetic progression is. a) a, ar, ar^2,... b) $\frac{a}{r}, a, ar, \ldots.$ c) a-d,a,a+d,.... d) a,a+d,a+2d,....
CO4	K1	7.	Tell the n^{th} derivative of x^n. a) nx^{n-1} b) x^{n-1} c) 0 d) 1
CO4	K2	8.	f(x,y) has maximum value if. a) f_{xx} is positve b) f_{xx} is negative c) f_{yy} is positive d) f_{yy} =0
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.	Identify the value of $x \xrightarrow{lim} 0(1+x)^{1/x}$. a) 0 b) 1 c) $\frac{1}{n}$ d) e

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.	Make use of partial fractions method and split $\frac{1}{(x-1)(x+2)^2}$.

CO2	K3	12a.	Estimate the sum the series $\frac{1}{10}+\frac{1}{10}.\frac{4}{20}+\frac{1}{10}.\frac{4}{20}.\frac{7}{30}+\cdots$ **(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.	Conclude the roots of $6x^3-11x^2-3x+2=0$ given that its root are in H.P.
CO4	K4	14a.	Comment on the value of y_n if $y = e^{mx} \sin(ax+b)$. **(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 $\lim_{x\to 0}\frac{1-\cos x}{x}$**.** **(OR)**
CO5	K5	15b.	Justify the value of $\frac{d}{dx}[\sqrt{x}(x^2+2)]$.

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.	Utilize partial fractions method and split $\frac{x+4}{(x^2-4)(x+1)}$. **(OR)**
CO1	K3	16b.	Construct the proof of $\frac{1}{(1-ax)^2(1-bx)}=\frac{A}{(1-ax)^2}+\frac{AB}{1-ax}+\frac{B^2}{1-bx}$ if $\frac{1}{(1-ax)(1-bc)}=\frac{A}{1-ax}+\frac{B}{1-bx}$
CO2	K4	17a.	Inspect the result: $\frac{1+\frac{1}{2!}+\frac{2}{3!}+\frac{2^2}{4!}+\cdots}{1+\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\cdots}=\frac{e}{2}$. **(OR)**
CO2	K4	17b.	Illustrate the proof of $\log\sqrt{12}=1+\left(\frac{1}{2}+\frac{1}{3}\right)\frac{1}{4}+\left(\frac{1}{4}+\frac{1}{5}\right)\frac{1}{4^2}+\left(\frac{1}{6}+\frac{1}{7}\right)\frac{1}{4^3}+\cdots$.
CO3	K4	18a.	Categorize the roots $3x^4-40x^3+130x^2-120x+27=0$, given that its roots are in G.P. **(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.	Justify the proof of $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=\sin 2u$ **if** $u=\tan^{-1}\left(\frac{x^3+y^3}{x-y}\right)$. **(OR)**
CO4	K5	19b.	Defend the proof of $y_n=\frac{(-1)^n n!}{x^{n+1}}\left[\log x-1-\frac{1}{2}-\frac{1}{3}-\cdots-\frac{1}{n}\right]$, if $y=\frac{\log x}{x}$.
CO5	K5	20a.	Evaluate the differential coefficient of (i) tan x (ii) sec x. **(OR)**
CO5	K5	20b.	Find the Differentiation of (i) $(1+x^2)\tan^{-1}x$ (ii) $\tan^{-1}\left(\frac{\cos x}{1+\sin x}\right)$.