SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc.(Statistics) END SEMESTER EXAMINATIONS NOVEMBER -2023
SEMESTER - II
20USTAT2002 - Allied Mathematics - II

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Prove that the image of the union of two sets is the union of images.
2. If $\{S_n\}_{n=1}^{\infty}$ is a sequence of non negative numbers and if $\lim_{n\to\infty} S_n$ = L then prove that L $\geq$ 0.
3. Prove that all subsequences of a convergent sequence of real numbers converge to the same limit.
4. State and prove law of the mean.
5. Estimate L(t^n)
6. Find L(te^{-t} sint)
7. Evaluate $L^{-1}\left[\frac{s+2}{s^2+4s+5)^2}\right]$
8. Show that $L^{-1}\left[slog\frac{s-12}{s+1}+2\right] = \frac{2(sinht - tcosht)}{t^2}$

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Prove that the set [0,1] $= \{x/0 \leq x \leq 1\}$ is uncountable.
10. Prove that the series $\sum_{n=1}^{\infty} \frac{1}{n}$ is divergent.
11. State and prove Rolle's theorem.
12. Evaluate the laplace transform of $t^2 cosat$ and $tsin^2\ at$.
13. Compute the inverse Laplace transform of $\frac{4s^2-3s+5}{(s+1)(s-1)(s-2)}$

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