

Roll.No.

20PAMCT3007

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.

M.Sc.Applicable Mathematics - END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - III

20PAMCT3007 - Complex Analysis

Total Duration : 2 Hrs. 30 Mins.

Total Marks : 60

Section B

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

1. State and prove Liouville's theorem. Hence deduce fundamental theorem of Algebra

2. Show that $\int_0^\pi \frac{d\theta}{a + \cos \theta} = \frac{\pi}{\sqrt{a^2 - 1}} (a > 1)$.

3. Let $\operatorname{Re} Z_n > 0$ for all $n > 1$. Prove that $\prod_{n=1}^{\infty} Z_n$ converges to a non zero number

if and only if the series $\sum_{n=1}^{\infty} \log z_n$ converges.

4. Prove that Green's functions are conformal invariants.

5. Derive Jensen's formula.

6. Let G be a region and suppose that f is a non-constant analytic function on G . Then prove that for any open set U in G $f(U)$ is open.

7. State and prove Schwarz's Lemma.

8. If f is an entire function that omit two values then prove that f is constant.

Section C

I - Answer any **TWO** questions ($2 \times 10 = 20$ Marks)

9. Let G be an open set. If $f : G \rightarrow \mathbb{C}$ is a differentiable function then prove that f is analytic on G .

10. State and prove Riemann mapping theorem.

11. a) If $U:G \rightarrow \mathbb{R}$ is a continuous function which has the mean value property then prove that f is harmonic.

b) State and prove the Harnack' Inequality.

12. If f is an entire function of finite genus μ then prove that f is of finite order $\lambda \leq \mu + 1$

Contd...

II - Compulsory question ($1 \times 10 = 10$ Marks)

13. State and prove the Argument principle. Hence deduce Rouché's theorem.
