Printed Pages– 3

A-6550

M. A./M. Sc. (Previous) Examination, April 2016

MATHEMATICS

Paper : Second

(Complex Analysis)

Time Allowed : Three hours

Maximum Marks : 100

Note : *Attempt five questions in all selecting one question from each unit. All questions carry equal marks. Symbols have their usual meanings.*

Unit-I

1. (a) If the function $f(z)$ is analytic on R then

$$\int_{\partial R} f(z)\, dz = 0$$

(b) Compute :

$$\int_{\gamma} z\, dz$$

where γ is directed line segment from 0 to $1+i$.

2. (a) State and prove Cauchy Goursat theorem.

(b) Show that

$$f(z) = |z|^2 = x^2 + y^2$$

has a derivative only at origin.

Unit-II

3. (a) State and prove Morera's theorem.

(b) State and prove Inverse function theorem.

4. (a) State and prove Cauchy's Inequality.

(b) State and prove Taylor's theorem.

Unit-III

5. (a) State and prove Cauchy Residue theorem.

(b) State and prove Hurwitz's theorem.

6. (a) State and prove Riemann mapping theorem.

(b) Find the poles and residuces of the function

$$\frac{1}{\left(z^2 - 1\right)^2}$$

Unit-IV

7. (a) State and prove Weierstrass factorization theorem.

(b) Define Gamma function and give its properties.

8. (a) State and prove Runge's theorem.

(b) Define the Analytic continuation and give an example of it. http://www.rdvvonline.com

Unit-V

9. (a) If $U : G \to R$ is continuous function which has the mean value property then U is harmonic.

(b) State and prove Harnack's theorem.

10. (a) State and prove Jenson's formula.

(b) State and prove the Little Picard theorem.