

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

MSc DEGREE EXAMINATION JUNE 2018  
(Second Semester)

Branch – MATHEMATICS

COMPLEX ANALYSIS

Time: Three Hours

Maximum: 75 Marks

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 15 = 75)

1 a State and prove Cauchy's theorem for rectangle.

OR

b State and prove Cauchy's integral formula.

2 a Evaluate  $\int_0^{\pi} \frac{d\theta}{a + \cos\theta}$ ,  $a > 1$ .

OR

b Evaluate  $\int_0^{\pi} \log \sin\theta \, d\theta$ .

3 a State and prove Weierstrass theorem.

OR

b State and prove Mittag - Leffler theorem.

4 a State and prove Riemann – Mapping theorem.

OR

b State and prove Schwarz – Christoffel formula.

5 a Show that any two bases of the same module are connected by a unimodular transformation.

OR

b Show that the zeros  $a_1, a_2, \dots, a_n$  and  $b_1, b_2, \dots, b_n$  of an elliptic function satisfy

$$a_1 + a_2 + \dots + a_n = b_1 + b_2 + \dots + b_n \pmod{M}.$$

c Show that the sum of the residues of an elliptic function is zero.

Z-Z-Z

END