B.Sc. Degree Examinations - Even Semester 2021

III Year VI Semester

Complex Analysis

Max Marks: 25

Answer any Five questions (5 * 5 = 25)

1. If a function f (z) = u (x, y) + iv(x, y) is analytic in a domain D, then prove that its component functions u and v are harmonic in D.
2. If $u = y^3-3x^2y$ find f(z) = u + i v such that f(z) is analytic. Also find v.
3. Evaluate $\int_C Z^{\frac{1}{2}}\, dz$ where C is the semi-circular path $z = 3e^{i\theta}$, $0 \leq \theta \leq \pi$ from z = 3 to z= -3
4. State and prove Cauchy Integral formula.
5. Expand the Laurent's series of $\frac{1}{z(z-1)^2}$ at z = 1.
6. State and prove Cauchy's Residue Theorem.
7. Find the bilinear transformation that maps the points z_1=-1, z_2=0, z_3=1 onto the points w_1=-i, w_2=1, w_3=i.