

# Agnihotri Engineering & GATE Classes

Scripting success stories

## Unit-1<sup>st</sup> (COMPLEX VARIABLE)

Q.1) Determine the analytic function whose real part is

(i)  $x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$

(ii)  $\log \sqrt{x^2 + y^2}$

(iii)  $x \sin x \cosh y - y \cos x \sinh y$

Q.2) Find the regular function whose imaginary part is

(i)  $\frac{x - y}{x^2 + y^2}$

(ii)  $e^x \sin y$

(iii)  $e^{-x} (x \cos 2y - y \sin 2y)$

Q.3) Find the analytic function  $z = u + iv$  if

(i)  $2u + v = e^x (\cos y - \sin y)$       (ii)  $u - v = \frac{x - y}{x^2 + 4xy + y^2}$

Q.4) If  $u(x, y) = 3x^2y + 2x^2 - y^3 - 2y^2$  find  $f(z)$  &  $v$  ?

Q.5) Find the invariant points of the transformation  $w = \frac{z - 1}{z + 1}$  ?

Q.6) Find the transformation which maps the points  $-1, i, 1$  of the  $z$ -plane onto  $1, i, -1$  of the  $w$ -plane?

Q.7) Find the bilinear transformation which maps  $1, i, -1$  to  $2, i, -2$  respectively. Find the fixed and critical points of the transformation?

Q.8) Find the Invariant point of bilinear transformation  $w = \frac{2z + 3}{z - 4}$  ?

Q.9) Find the Invariant point of bilinear transformation  $w = \frac{z - 1 - i}{z + 2}$  ?

Q.10) Find the critical point of  $w = z^4 - 4z$  ?

Classes on (ED, BEEE, M1, M2, M3, NA, CONTROL, DSP & other GATE oriented Engineering Subjects)

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