Dronacharya Group of Institutions, Greater Noida
Department of APS
Subject Name: Mathematics-II (KAS 203)
Lecture wise Question Bank

Unit No.: 4 **Unit Name: Complex Variable-Differentiation**

Lecture No.	Questions	Weightage of Question as per University Exam (In terms of Marks)	Reference
L1	Explain analytic function with the help of suitable examples.	2	
	Define nessesary and sufficient condition for a mapping to be conformal.	2	
L2	Define Cauchy-Riemann equation	2	
	Prove by giving the example that a function is not analytic but cauchy-Riemann equations are satisfied.	5	
L3	Prove that function with constant modulus is constant.	5	
	Find the value of c1 and c2 such that the function is analytic $= x^2 + c_1y^2 - 2xy + i(c_2x^2 - y^2 + 2xy)$	5	
L4	Show that f (z) =logz is analytic everywhere in the complex plane except at the origin.	5	
	Show that the function defined by f (z) =√(|xy|) is not regular at the origin, although caucy-Riemann equations are satisfied there.	5	
L5	Show that the function u is harmonic and find the corresponding analytic function f(z) $= x^3 - 3xy^2$	7	
	Find the image of $2x + y - 3 = 0$ under the transformation $w = z + 2i.$	5	
L6	Verify if f (z) is analytic or not? $= \frac{xy^2(x+iy)}{x^2+y^4}, z \neq 0; f(0) = 0$	7	
	Determine the bilinear transformation which maps z1=0,z2=1,z3=∞ onto w1=i,w2=-1,w3=-i respectively.	5	
L7	Show that the following functions are harmonic and find their harmonic conjugate function u $= \frac{1}{2}\log(x^2 + y^2).$	5	
	Determine the analytic function f(z)in terms of z whose real part is $e^{-x}(xsiny - ycosy)$	7	