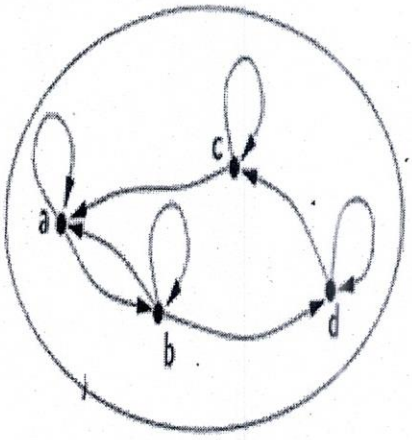
International Islamic University Chittagong (IIUC)
Department of Computer Science and Engineering (CSE)
B. Sc. in CSE, Mid Term Examination, Spring-2024
Course Code: MATH-2407, Course Title: Mathematics-IV

Time: 1:30 Hours **Marks: 30**

[Answer the following questions. Figures in the right margin indicates full marks]

			Marks	CLO	DL
1.	a)	Let the function $f: R^{\#} \to R^{\#}$ be defined by $y = f(x) = x^2 + x - 1$ then find the value of $f^{-1}(10)$	2	CLO1	C2
	b)	Prove De-Morgan's theorem $(A \cup B)' = A' \cap B'$	2	CLO1	C2
	c)	 Determine whether the above relation is Anti-symmetric and Transitive	2	CLO1	C2
	d)	Using Demoivres theorem find the quadratic equation whose roots are the n-th power of the roots of the equation, $x^2 - 2x\cos\theta + 1 = 0$	4	CLO1	C2
		Or			
		If $(1+i\frac{x}{a})(1+i\frac{x}{b})(1+i\frac{x}{c})..... = A + iB$, Then prove that $(1+\frac{x^2}{a^2})(1+\frac{x^2}{b^2})(1+\frac{x^2}{c^2})..... = A^2 + B^2$	4	CLO1	C2
2.	a)	A straight line joining $A(-j)$ and $B(2+j)$ in the z-plane is mapped onto the w-plane by the transformation equation $w = \frac{1}{z}$	8	CLO1	C2
	b)	Test the function $f(x,y,z) = x^2y + y^2z + z^2y$ is harmonic or not.	2	CLO2	C3
		Or			
		Determine the function, $w = e^z$ is regular (analytic) or not.	2	CLO2	C3
3.	a)	Evaluate the integral $\int_c \bar{z}\,dz$ from $z = 0$ to $z = 2 + i$ along the curve c.	6	CLO2	C3
	b)	Using Cauchy's Integral Formula evaluate $\int_c \frac{z}{z^2 - 3z + 2}dz$ where c is the circle $\lvert z - 1\rvert = \frac{1}{2}$	4	CLO2	C3
		Or			
		Evaluate $\int_c \frac{2z+1}{z^2+z}dz$ Where c is the circle $\lvert z\rvert = \frac{1}{2}$	4	CLO2	C3