Bachelor of Computer Application - I First Semester (Old) **1BCA6 - Paper-VI : Discrete Mathematics**

P. Pa Tim	ages : : e : Thr	$\begin{array}{c} 2\\ \text{ee Hours} \\ \end{array} \qquad \qquad$	GUG/W/18/1095 Max. Marks : 80			
	Note	 All questions are compulsory and carry equal marks. Draw neat and labelled diagram and use supporting data wherever Avoid vague answers and write specific answer related to question 	r necessary. n.			
1.		EITHER.				
	a)	Explain following.i) Finite setii) Singleton setiv) Null set or empty set.	8			
	b)	Prove that $A \cup B = A \cap B \Leftrightarrow A = B$.	8			
		OR				
	c)	Prove following. i) $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is tautology.	8			
		ii) $p \lor q \leftrightarrow p$ is a tautology.				
	d)	Construct the truth table for the following formula $(\neg P \land (\neg Q \land R)) \lor (Q \lor R) \lor (P \land R)$	8			
2.		EITHER.				
	a)	Determine the value of n if,	8			
		i) $4X^n p_3 = {}^{n+1} p_3$ ii) $6X^n p_3 = 3X^{n+1} p_3$				
	b)	What is In-Degree and out-Degree? Explain with example.	8			
		OR				
	c)	Explain WARSHALL'S algorithm with example.	8			
	d)	What is haring function? Explain universal method.	8			
3.		EITHER.				
	a)	What is Undirected Graphs. Ex. Let $v = \{1, 2, 3, 4\}$ and $E = \{(1, 2), (1, 4), (3, 4), (2, 3)\}$. Draw a graph.	8			
	b)	Explain minimal spanning tree. Give example for it.				

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	c)	Exp i) iii)	lain following terms. Height of tree Complete Binary tree.	ii iv	i) v)	Binary tree Level of a Node	8			
	d)	Exp	lain Euler paths and circuits.				8			
4.		EIT	HER.							
	a)	Wha	up.	8						
	b)	Find	table is shown.	8						
	- /				0	1				
			-	s ₀	s ₀	s ₁				
				s ₁	s ₁	s ₂				
				s ₂	s ₂	s ₀				
		OR								
	()	i)	Language	ii	i)	Derivation trees	0			
		iii)	Grammar	iv	v)	Direct Derivability				
	d)	Consider the binary operation $*$ on Ω the set of relational number defined by								
	u)	$a * b - a^2 + b^2 \forall a b \in O$								
		$a * b = a + b = \sqrt{a}, b \in Q.$ Determine whether * is commutative								
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5.	Solve all questions.									
		a)	Explain following terms.				4			
			i) Union of sets.	ii	i)	Difference of sets.				
		b)	Determine the value of n if,				4			
		,	$3X^n p_4 == 7X^{n-1} p_4.$							
		c) What is Lattice? Explain its different properties.								
		d) Find the Left linear and Right liner grammar for following language. (0 + 1) = 0 + (1 + 1) + (0 + 1)								
			1) $U^{*}(1(U+1))^{*}$	11	U)	$(0+1)^{*}00(0+1)^{*}$				

OR
