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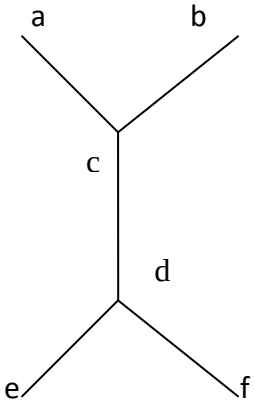
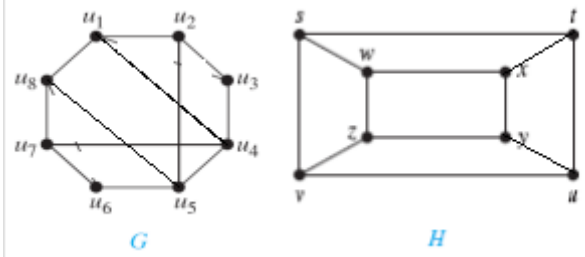
CHENNAI CAMPUS
Vandalur - Kelambakkam Road, Chennai - 600127

Arrear – May 2013

Programme	:	**M.Tech., (SDM)**	Semester	:	**---**
Course	:	**Mathematical Foundation for Computer Science**	Code	:	**MAT513**
Time	:	**3 Hours**	Max. Marks	:	**100**

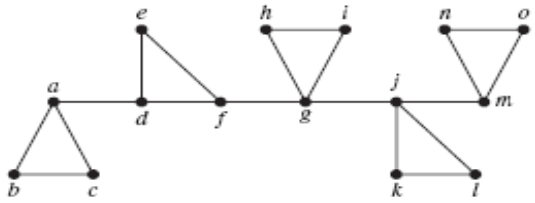
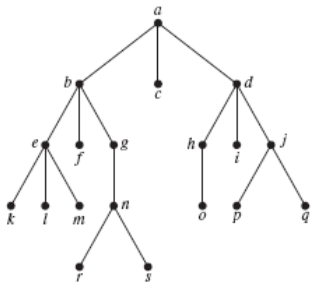
PART – A (8 X 5 = 40 Marks)

Answer <u>Any Eight</u> Questions

1.		Check whether ⌐ (P ↔ Q) and (P V Q) Λ ⌐ (P Λ Q) are logically equivalent.	
2.		Check the validity of the argument: " A student in this class has not read the book" and " Everyone in this class passed the first exam" imply the conclusion " Someone who passed the first exam has not read the book"	
3.		Construct a K-map to simplify $F(w,x,y,z) = wxyz' + w'xyz + wx'yz' + wxyz + wxyz'$.	
4.		State and prove the Isotonicity properties of a Lattice	
5.		State and prove Fermat's little theorem	
6.	a)	Define Lattices. Determine whether the following is a lattice or not. 	
7.		Check whether the graphs G and H are isomorphic or not? 	
8.		The degree sequence of a graph is the sequence of the degrees of the vertices of the graph in non increasing order. Is there a graph with the following degree sequence (5, 4, 3, 3, 2, 2, 2, 2, 1)? Draw such a graph if it exists.	
9.		Express the gcd(24; 14) as 24x + 14z using Euclidean algorithm.	
10		State and Prove Wilson's Theorem	

PART – B (4 X 15 = 60 Marks)

Answer any Four Questions

9.	a)	Construct the truth table for the following : (P ↔ R) ↔ (PΛQ) V (¬P V ¬Q) and find the PCNF and PDNF	[9]
	b)	Explain the difference between the following using simple examples: (i) Proposition Vs Predicate (ii) Conditional Proof Vs Indirect Method (iii) Consistent Vs InConsistent Premises	[6]
10.		Find the Sum-of-Product and Product-of-Sum canonical forms of $wx + w\overline{x}z + \overline{w}xyz + yz + \overline{w}\,\overline{x}y\overline{z}$ and simplify the expansion using K-map. Draw the circuit of the given expression.	[15]
11.	a)	Let D_{30} be the set of all divisors of 30. Check whether $< D_{30}, / >$ is a Distributive, Complemented Lattice or not?. Draw the Hasse diagram.	[8]
	b)	Factor $2^{13} - 1$.	[7]
12.		Find an integer x such that $x \equiv \gcd(\varphi(12), \varphi(8)) \pmod{15}$, $x \equiv gcd(\varphi(7), \varphi(9)) \pmod{17}$ and $x \equiv \gcd(\varphi(6), \varphi(4)) \pmod{7}$	[15]
13.	a)	The weights of the edges of the graph is given in the following table, find the minimum spanning tree. 	[6]
	b)	Write the pre order, post order and in order expressions of the following binary tree: 	[9]
14.	a)	Construct the truth table for the following : (P ↔ Q) ↔ (PΛQ) V (¬ P V ¬ Q)	[6]
	b)	Explain the difference between the following using simple examples: (i) Proposition Vs Predicate (ii) Conditional Proof Vs Indirect Method (iii) Consistent Vs InConsistent Premises	[9]

a-b: 1	d-e: 3	g-h: 4	j-k: 2	m-n: 2	a-c: 2	d-f: 5	h-i: 2	k-l : 2	m-o: 3
b-c: 4	e-f: 1	i-g: 1	l-j : 3	n-o : 4	a-d: 3	f-g: 9	g-j: 13	j-m: 4	

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