VIT UNIVERSITY
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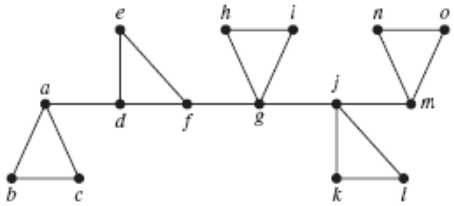
CHENNAI CAMPUS

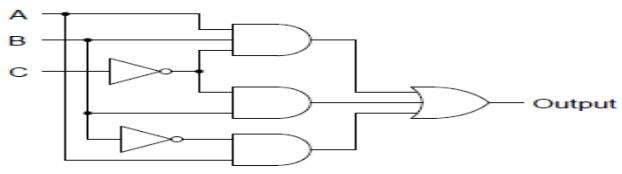
Continuous Assessment Test

Programme	:	**M.Tech., (SDM)**	Semester	:	**III & IV**
Course	:	**Mathematical Foundation for Computer Science**	Code	:	**MAT5**
Time	:	**1½ Hours**	Max. Marks	:	**50**

Answer ALL Questions

1.	a)	Convert the following into symbolic expression and Check whether it is a tautology or not using truth table: "The necessary and sufficient condition for the statement 'If I don't study, then I fail' is 'I study or I fail' "	
	b)	Check the validity of Existence of Superman: If superman were able and willing to prevent evil, then he would so. If superman were unable to prevent evil, then he would be powerless. If superman were unwilling to prevent evil, then he would be malevolent. Superman doesn't prevent evil. If superman exists, then he is neither powerless nor malevolent. Therefore, superman doesn't exist.	
2.	a)	State and Prove Wilson's Theorem	[4]
	b)	Find the gcd(2123,412). Express the gcd as a linear combination of the given two numbers.	[6]
3.	a)	Find the cut vertices and cut edges of the following graph. Justify your answer  Is it a bipartite graph?.	[5]
	b)	The weights of the edges of the above graph is given in the following table, find the minimum spanning tree using Prim's algorithm. (Write stage by stage updation)	[5]

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

4.	a)	Check the validity of the conclusion using predicates. "Every basketball player is tall. All tall persons like Ice cream. Arjun is a Basketball player. Therefore Arjun likes ice cream".	[4]
	b)	Let D_{42} be the set of all divisors of 42. Check whether $< D_{42}, / >$ is a Distributive, Complemented Lattice or not?. Draw the Hasse diagram.	[6]
5.		Use Boolean algebra to simplify the following logic gate circuit:  Find the Sum-of-Product and Product-of-Sum canonical forms of the given circuit. Apply the Quine-McKluskey algorithm to minimize the Sum-of-Product of Problem	[10]