Code No: P21CST05

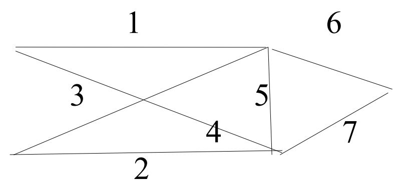
HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH ISEMESTER END REGULAR EXAMINATIONS, JAN - 2023
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(IT Branch)

Time: 3 hours Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
1.	a)	Explain the term tautology? Show that $[(p\rightarrow q)\rightarrow r]\rightarrow[(p\rightarrow q)\rightarrow(p\rightarrow r)]$ is tautology ?	[7M]	1	3
	b)	Show that the formulas $p\vee(q \wedge r)$ and $(p\vee q) \wedge (p \vee r)$ are logically equivalent using PCNF?	[7M]	1	2
		OR			
2.	a)	Explain Well Formed formulas with suitable example.	[7M]	1	3
	b)	If there were a meeting, then catching the bus was difficult. If they arrived on time then catching the bus was not difficult. They arrived on time therefore there was no meeting. Show that the statements constitute a valid argument.	[7M]	1	4
		UNIT-II			
3.	a)	Prove that $(A-C) \cap (B-C) = (A\cap B) - C$ for the sets A,B,C.	[7M]	2	2
	b)	Let the Relation R be R={(1,2) ,(2,3),(3,3)} on the set A= {1,2,3}. What is the Transitive Closure of R?	[7M]	2	2
		OR			
4.	a)	Define equivalence relation. Show that the relation equal on set of integers is equivalence relation.	[10M]	2	3
	b)	Draw the Hasse diagram for the divisibility on the set {1,2,3,6,12,24,36,48,96}.	[4M]	2	4
		UNIT-III			
5.	a)	State the properties of the pigeon hole principle.	[7M]	3	3
	b)	Show that (Z,*) is a group, where * is defined by a*b = a+b+1	[7M]	3	4
		OR			
6.	a)	Define binomial theorem? What is the coefficient of $x^{101} y^{99}$ in the expansion of $(2x-3y)^{200}$?	[7M]	3	3
	b)	Define semi-groups and monoids. Give examples and properties of each.	[7M]	3	4
		UNIT-IV			
7.	a)	Solve the recurrence relation $a_n - 6 a_{n-1} + 9 a_{n-2} = 0$ for $n \geq 2$	[10M]	4	2
	b)	Solve the recurrence relation $F_{n+2} = F_{n+1} + F_n$ for $n \geq 0$, given $F_0 =0$, $F_1= 1$	[4M]	4	2
		OR			
8.	a)	What is a Generating function and explain the operations on generating functions and also write the applications of generating functions?	[7M]	4	3
	b)	Solve the recurrence relation $a_n+ a_{n-1} - 8 a_{n-2} - 12 a_{n-3}= 0$ for n>=3, given that $a_0=1, a_1= 5$ and $a_2=1$	[7M]	4	4
		UNIT-V			

9.	a)	Explain planar graphs with examples and also explain the multi graph with example.	[7M]	5	2
	b)	What are the applications of Eulerian graph in computer science? Explain.	[7M]	5	3
OR					
10.	a)	Show that the complete graph K_5 and complete bipartite graph $K_{3,3}$ are not planar?	[7M]	5	3
	b)	Explain Kruskal's algorithm to find minimal spanning tree of the graph with suitable example. Find minimal spanning tree for the given graph. 	[7M]	5	4

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