Code No: P21CST05

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH ISEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
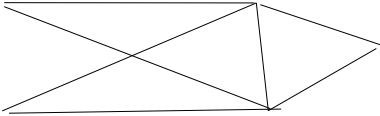### MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(IT Branch)

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)	Obtain the Principal conjunctive normal form of $(P \to Q)V (\sim P \lor Q \lor R)$.	[7M]	1	3
	b)	What is mean by contradiction? Explain it with an example.	[7M]	1	2
		OR			
2.	a)	Prove that (i) $\sim(P\uparrow Q)\leftrightarrow \sim P\downarrow\sim Q$ (ii) $\sim(P\downarrow Q)\leftrightarrow \sim P\uparrow\sim Q$ without using truth table?	[7M]	1	3
	b)	State and prove the DeMorgan's Laws of predicate logic.	[7M]	1	4
		UNIT-II			
3.	a)	If $f = \begin{pmatrix} 1\,2\,3\,4 \\ 2\,4\,3\,1 \end{pmatrix}$ then find f^{-1} and show that $(f \circ f^{-1}) = (f^{-1} \circ f) = I$?	[7M]	2	2
	b)	Let A = {1, 2, 3, 4, 5}, R ={(1, 1), (1, 2), (2, 1), (2, 2), (3, 3), (3, 4), (4, 3), (4, 4), (5, 5)} and S = {(1, 1), (2, 2), (3, 3), (4, 4), (5, 4), (4, 5), (5, 5)}. Find the smallest-equivalence relation containing R and S and compute the partition of A that it produces.	[7M]	2	2
		OR			
4.	a)	Show that for any two sets A and B, $A – (A \cap B) = A – B$	[10M]	2	3
	b)	Explain lattice with example.	[4M]	2	4
		UNIT-III			
5.	a)	Explain sum rule and product rule with example and also find the number of Permutations the word MAYAJALAM?	[7M]	3	3
	b)	Let G be a set of all non zero real numbers and let a*b = ab/2. Show that is an abelian group.	[7M]	3	4
		OR			
6.	a)	There are 40 computer programmers for a job. 25 know Java, 28 know Oracle and 7 know neither language. Using principle of inclusion exclusion find how many know both languages.	[7M]	3	3
	b)	A book binder is to bind 10 different books in red, blue and brown cloth. In how many ways can he do this if each colour of cloth is to be used for at least one book?	[7M]	3	4
		UNIT-IV			
7.	a)	Find the coefficient of x^{27} in the function $(x^4 + x^5 + x^6 + ……)^5$.	[7M]	4	2
	b)	Given $a_n = 4 a_{n-1} – 4 a_{n-2} + (n^2+1) 2^n$. Find the solution of non-homogeneous relation, $a_0= 0$ and $a_1=1$.	[7M]	4	2
		OR			
8.	a)	Solve the recurrence relation $a_{n+2} – 4 a_{n+1} + 4 a_n = 2^n$.	[7M]	4	3
	b)	Solve the recurrence relation $a_k - 7 a_{k-1} + 10 a_{k-2} =6 + 8k$, $a_0 = 1$, $a_1 =2$	[7M]	4	4
		UNIT-V			

9.	a)	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	2
	b)	Explain Breadth First Search with suitable example?	[7M]	5	3
OR					
10.	a)	Explain Hamiltonian graph with example.	[7M]	5	3
	b) .	Explain isomorphism of two graphs? Check whether the given graphs G1 and G2 are isomorphic or not? Give reasons.	[7M]	5	4

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