Q.P. Code:	16CS507	



SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR (AUTONOMOUS) B.Tech II Year I Semester Supplementary Examinations December-2021

MATHEMATICAL FOUNDATIONS OF COMUTER SCIENCE

(Common to CSE & CSIT)

Time: 3 hours

Max. Marks: 60

R16

(Answer all Five Units $5 \times 12 = 60$ Marks)

UNIT-I

1	a	Define tautology and contradiction with examples	6M
	b	Explain conjunction and disjunction with suitable examples.	6M
		OR	
2	a	Show that (a) $(\neg P \land \neg Q \land R) \lor (Q \land R) \lor (P \land R) \Leftrightarrow R$	6M
	b	What is principle disjunctive normal form? Obtain the PDNF of	6M
		$P \to ((P \to Q) \land \neg (\neg Q \lor \neg P))$	

UNIT-II

3	a	Let f: A \rightarrow B, g: B \rightarrow C, h: C \rightarrow D then prove that ho(gof) = (hog)of	6M
	b	Define a binary relation. Give an example. Let R be the relation from the set $A = \{1, $	6M
		3, 4} on itself and defined by $R = \{(1, 1), (1, 3), (3, 3), (4, 4)\}$ the find the matrix of R,	
		draw the graph of R.	

OR

4	a	Define and give an example for group, semigroup, subgroup & abelian group.	6M
	b	Show that every homomorphic image of an abelian group is abelian.	6M

UNIT-III

- 5 a Enumerate the number of non-negative integral solutions to the inequality $x_1 + x_2 + x_3 + 6M$ $x_4 + x_5 \le 19$.
 - **b** How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$ where each (i) $x_i \ge 2$ 6M (ii) $x_i \ge 2$

OR

- 6 a Out of 5 men and 2 women, a committee of 3 is to be formed. In how many ways Can it 6M be formed if at least one woman is to be included?
 - **b** Find the number of arrangements of the letters in the word ACCOUNTANT. 6M

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UNIT-IV

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7	a	Find the generating function for the sequence 1, 1, 1, 3, 1, 1	6M
	b	Find the coefficient of x^{20} in $(x^2 + x^3 + x^4 + x^5 + x^6)^5$?	6M
		OR	
8	a	Determine the sequence generated by (i) $f(x) = 2e^{x} + 3x^{2}$ (ii) 7 $e^{8x} - 4 e^{3x}$	6M
	b	Find the sequence generated by the following generating functions	6M
		(i) $(2x-3)^3$ (ii) $x^4/(1-x)$	
		UNIT-V	
9	a	Define isomorphism. Explain Isomorphism of graphs with a suitable example.	6M
	b	Explain graph coloring and chromatic number give an example.	6M
		OR	
10	a	Give an example of a graph that has neither a Eulerian circuit nor a	6M
		Hamiltonian circuit.	
	b	Explain In degree and out degree of graph. Also explain about the adjacency	6M
		matrix representation of graphs. Illustrate with an example.	

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