R20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2024
Discrete Mathematics
(CSE, IT, CSE-CS, CSE-AIML, CSE-DS, B.Tech-AIDS & B.Tech-AIML)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

				BCLL	CO(s)	Marks
			SECTION-I			
1	A		Construct truth table for the following $\{(P \land Q) \lor (\Gamma P \land R)\} \lor (Q \land R)$	L3	CO-I	[7M]
	B		Show that $\Gamma(P \lor (\Gamma P \land Q))$ and $\Gamma P \land \Gamma Q$ are logically equivalent.	L3	CO-I	[7M]
			OR			
2	A		Show that the following implication $(P \rightarrow Q) \rightarrow Q \Rightarrow P \lor Q$.	L3	CO-I	[7M]
	B		Obtain the Principal conjunctive normal form $(\Gamma P \rightarrow R) \land (Q \leftrightarrow P)$	L3	CO-I	[7M]
			SECTION-II			
3	A		Give an example of a relation which is irreflexive, anti-symmetric and transitive and justify.	L3	CO-II	[7M]
	B		Define Bounded lattice, Distributive lattice, Complement lattice	L3	CO-II	[7M]
			OR			
4	A		Let R be the relation on set A ={1, 2, 3, 4 } defined by R = {(1, 1), (1, 2), (2, 1),(2,2),(3,4), (4,3) (3,3) (4,4). Show that R is an equivalence relation and draw its diagraph.	L3	CO-II	[7M]
	B		Draw the Hasse diagram of (P (A), $\subseteq$) where A = $\{a, b, c\}$.	L3	CO-II	[7M]
			SECTION-III			
5	A		Show that the set G = {1,-1, i, -i} is a group with respect to multiplication.	L3	CO-III	[7M]
	B		Find the number of integers between 1 and 100 that are divisible by 2, 3, 5.	L3	CO-III	[7M]
			OR			
6	A		Define Homomorphism and isomorphism between two groups.	L3	CO-III	[7M]
	B		In how many ways can the letters {4a, 3b, 2c} be arranged so that all the letters of same kind are not in a single block.	L3	CO-III	[7M]
			SECTION-IV			
7	A		Find the coefficient of x^{25} in$(1 + x^3 + x^8)^{10}$.	L3	CO-IV	[7M]
	B		Solve the recurrence relation $a_n = 4(a_{n-1} - a_{n-2})$, $a_0 = 1$ $a_1 = 3$.	L3	CO-IV	[7M]
			OR			

| 8 | | Solve the recurrence relation $a_{n+2} - 5a_{n+1} + 6a_n = 2$ with initial condition $a_0 = 1\ and\ a_1 = $ -1. | L3 | CO-IV | [14M] |

SECTION-V

| 9 | A | What are the steps involved in determining whether two given graphs are isomorphic are not? | L3 | CO-V | [7M] |
| | B | Define tree, Binary tree, Spanning tree, minimal spanning tree. | L3 | CO-V | [7M] |

OR

| 10 | A | State the Euler's Theorem of graph theory. What is the largest possible number of vertices in a graph with 35 edges and all vertices of degree at least three? | L3 | CO-V | [7M] |
| | B | Define Euler's Circuit ,Hamilton path, Hamilton cycle. | L3 | CO-V | [7M] |

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